

Environmental Assessment
SFPP East Line Expansion Project
El Paso to Phoenix

NM-030-2004-0085

Prepared for
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Abbreviations and Acronyms

ACS	Archaeological Consulting Services
ADEQ	Arizona Department of Environmental Quality
AGFD	Arizona Game and Fish Department
ARPA	Archaeological Resource Protection Act
ASM	Arizona State Museum
ATP	Archaeological Testing Plan
BE	biological evaluation
bgs	belowground surface
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	Best Management Practices
BNSF	Burlington Northern Santa Fe Railroad
bpd	barrels per day
bph	barrels per hour
CAA	Clean Air Act
CAP	Central Arizona Project
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CFPO	ferruginous pygmy owl
cm	centimeter
CMP	Construction Monitoring Plan
CMT	Construction Monitoring Team
CRMD	Cultural Resource Management Division, Arizona State Museum
CWA	Clean Water Act
dBA	decibels on A-weighted scale
dbh	diameter at breast height
DMAFB	Davis-Monthan Air Force Base
DR	Decision Record
DTP	Discovery Treatment Plan
EA	Environmental Assessment
EJ	Environmental Justice
EO	Executive Order
ENMU	Eastern New Mexico University
EPAS	El Paso Archaeological Society
EPNG	El Paso Natural Gas
ESA	Endangered Species Act

FERC	Federal Energy Regulatory Commission
FTE	full-time equivalent
GRIC	Gila River Indian Community
HDD	horizontal directional drilling
hp	horsepower
Hwy	highway
I-10	Interstate 10
kV	kilovolt
lin ft	linear feet
m	meter
m^2	square meter
MAOP	maximum allowable operating pressure
MBTA	Migratory Bird Treaty Act of 1918
MLA	Mineral Leasing Act
MP	milepost
MSDS	Material Safety Data Sheets
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMDGF	New Mexico Department of Game and Fish
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWMRP	Noxious Weed Management and Rehabilitation
OPA	Oil Pollution Act
OPS	Office of Pipeline Safety
OSHA	Occupational Safety and Health Administration
PM	particulate matter
PNM	Public Service Company of New Mexico
ppm	parts per million
PSB	Public Service Board
RMIS	Regional Input-Output Multiplier (Bureau of Economic Analysis)
RMP	Resource Management Plan
ROW	right-of-way
SCIP	San Carlos Irrigation Project
SFPP	SFPP, Inc.
SHPO	State Historic Preservation Office (Arizona)

SPCP	Spill Prevention and Control Plan
SWPPP	Storm Water Pollution Prevention Plan
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TDS	total dissolved solids
TXDOT	Texas Department of Transportation
UPRR	Union Pacific Railroad
USBR	U.S. Bureau of Reclamation
USC	United States Code
USDOC	U.S. Department of Commerce
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
U.T. Austin	University of Texas, Austin
UTEP	University of Texas, El Paso
VOC	volatile organic compound
WCRM	Western Cultural Resources Management
WNMU	Western New Mexico University
WSA	William Self and Associates
WSCA	Wildlife of Special Concern in Arizona

SECTION 1.

Introduction

SECTION 1

Introduction

The East Line Expansion Project analyzed in this document constitutes a federal undertaking (i.e., a decision), which has the potential to affect the quality of the human environment on federal land administered by the Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA), and Fort Bliss Military Reservation in Texas. The proposed project would cross federal, state, tribal, and state lands in Texas, New Mexico, and Arizona. The BLM, Las Cruces Field Office, has been designated as Lead Federal Agency for the preparation of an Environmental Assessment (EA) while the BIA and Fort Bliss Military Reservation are cooperating agencies. Therefore, the action must be analyzed pursuant to the National Environmental Policy Act (NEPA). Under NEPA, federal agencies must carefully consider environmental concerns in the decision making process and provide relevant information to the public for review and comment.

The purpose of this EA is to evaluate and disclose the potential direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. This report is organized into six sections:

- Section 1 – Introduction: Includes project background information as well as the purpose and need for the project.
- Section 2 – Proposed Action and Alternatives: Describes the proposed action along with alternatives. This section also contains a description of alternatives considered but eliminated from further analysis as well as best management practices that would be implemented.
- Section 3 – Affected Environment and Environmental Consequences: Provides a description of the affected environment for each resource area and describes the environmental effects of implementing the proposed action and no action.
- Section 4 – List of Preparers: Provides a list of people involved in the preparation of this EA.
- Section 5 – Consultation and Coordination: Provides a list of agencies consulted during the development of this EA.
- Section 6 – References: Provides a list of references used in preparing this EA.

Additional documentation, including management plans to be implemented for the project, can be found in the appendices of this EA.

This section describes: (1) Project Background, (2) Purpose and Need, (3) Decision Framework, (4) Pipeline Integrity and Public Safety, (5) Public Involvement, (6) Conformance with Existing Plans, Statutes, or Other Regulations, and (7) Summary of Required Permits and Approvals.

1.1 Project Background

SFPP, L.P. (SFPP), operating partnership for Kinder Morgan Energy Partners, L.P., is proposing to construct a petroleum products pipeline that would generally parallel existing pipelines along SFPP's present route from El Paso, Texas to Phoenix, Arizona (Figure 1.1-1). The SFPP East Line Expansion Project (East Line) would provide much needed additional capacity for petroleum products into the rapidly growing Tucson/Phoenix markets. The current SFPP plan is to begin construction in July 2005.

The project is divided into four logical segments from east to west (Segment 1 to Segment 4). The segments are based on continuous or contiguous areas where construction of the new pipeline is proposed. The route of the new segments was dictated largely by the location of the existing pipeline. A breakout facility including petroleum storage tanks is planned for El Paso in Segment 1.

1.2 Purpose and Need

SFPP's existing East Line is currently the only petroleum products pipeline system serving the Phoenix and Tucson areas from the east. SFPP's East Line has operated at its maximum capacity since early 1999 and can now carry only approximately 65 to 75 percent of the demand. The Longhorn Pipeline from Houston to El Paso, which started operations in October 2004 but is not yet pumping into the East Line system, will only serve to exacerbate this already serious bottleneck on the East Line. The expectation is that Longhorn and other shippers will make use of the expanded East Line system upon completion in early 2006. Moreover, refineries and a pipeline currently serving the East Line are undergoing significant expansions.

Accordingly, to provide additional capacity to serve the growing demand for delivery of petroleum products into Arizona, SFPP proposes to expand its East Line. This expansion would increase East Line capacity by approximately 53,000 barrels per day on the El Paso to Tucson segment and by approximately 44,000 barrels per day on the Tucson to Phoenix segment.

The proposed expansion would increase available petroleum product supply to the Tucson/Phoenix markets by eliminating constraints on the transportation of products from the east. The startup of the Longhorn Pipeline from Houston to El Paso will, for the first time, permit significant volumes from the Texas Gulf Coast refineries to reach SFPP's East Line. The East Line Expansion from El Paso to Phoenix would enhance the opportunities for Texas Gulf Coast refineries to compete with the refineries that now serve the Tucson/Phoenix markets from the west.

FIGURE 1.1-1
PROPOSED PROJECT OVERVIEW
EAST LINE EXPANSION PROJECT
ENVIRONMENTAL ASSESSMENT

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The need for this project is based on the region's demands for additional petroleum products supply. The proposed project would provide means to supply additional petroleum products to the Tucson/Phoenix market in the most cost-effective, efficient, and environmentally-friendly way possible. The purpose of the proposed pipeline is to

- Aid the region in providing means to supply additional petroleum products for the rapidly growing population. The state of Arizona has one of the fastest population growth rates for the last 50 years. Most of the growth is within the metropolitan Phoenix and Tucson areas known as the Tucson/Phoenix metropolitan corridor. Approximately 80 percent of Arizona's population of 5 million people live in the Tucson/Phoenix metropolitan corridor (U.S. Geological Survey [USGS] Geological Mapping Program Office, May 2001). According to the U.S. Census Bureau, the Phoenix-Mesa metropolitan area population increased by 45.3 percent from 1990 to 2000. The April 1, 1990 population was 2,238,480 and the April 1, 2000 population was 3,251,876, making Phoenix-Mesa the 8th fastest growing metropolitan area in the last decade.
- Ameliorate potential environmental impacts caused by hauling petroleum products using trucks. Without the planned East Line Expansion Pipeline, a considerable amount of additional petroleum products would be transported to the Tucson/Phoenix area by alternative modes as population increases. The proposed pipeline would provide a safer and more energy-efficient alternative to truck hauling for the following reasons:
  - Eliminate the need for long hauling of petroleum products in trucks on the associated roads and highways.
  - Reduces air pollution from tanker trucks.
  - Decreases the chance of spillage and other traffic accidents involving trucks carrying petroleum products.
  - Lessens the wear on highways and roads caused by repetitive truck passage.
  - Diminishes the impacts of noise pollution along the truck routes.

1.3 Decision Framework

The purpose of this EA is to disclose the environmental consequences that are anticipated to occur through implementation of the proposed action and alternatives under consideration. This document was prepared in consultation with various federal, state, and local government agencies, which aided in determining the environmental consequences of the proposed project.

A Decision Record (DR) will be provided by the BLM Las Cruces Field Office. This decision will apply to public land administered by the BLM in New Mexico and Arizona. The BIA would simultaneously sign a separate DR and would issue individual right-of-way (ROW) easements.

If approved, the following documentation would be attached to the DR and the subsequent ROW grant issued by the BLM and easements by the BIA: (1) environmental protection measures for federal and tribal lands; (2) the U.S. Fish and Wildlife Service (USFWS) Biological Opinion for threatened and endangered species, if required under formal Section 7 consultation; (3) the New Mexico, Arizona, and Texas State Historic Preservation Offices (SHPOs) and appropriate consulting parties concurrences with the proposed treatment of cultural resources; and (4) additional mitigation measures or permit conditions required by the BLM, BIA, Fort Bliss Military Reservation, and USFWS.

The BLM is the primary agency responsible for granting ROWs across federal land. The primary decisions to be addressed and made by the BLM include:

- A 30-year Mineral Leasing Act (MLA) ROW grant would include a plan of development, stipulations and mitigation measures be issued for a permanent pipeline ROW that will support pipeline construction and operation on federal land.
- Temporary Use Permits would be granted for roads and temporary work areas needed for project construction on federal land.

The BIA/Gila River Indian Reservation is the primary agency responsible for granting ROW easements across tribal lands. The primary decisions to be addressed and made by the BIA include:

- A 20-year BIA easement that would include stipulations and mitigation measures be issued for a permanent ROW that will support pipeline construction and operation on tribal lands.

Fort Bliss Military Reservation is responsible for granting easements across military lands.

1.4 Pipeline Integrity and Public Safety

The Mineral Leasing Act (30 USC § 181-263) authorizes the BLM to grant pipeline ROWs and permits through federal land. Section 185 of the MLA also requires the BLM to protect public safety and environmental resources. If a ROW grant or permit were issued, the BLM would include stipulations and other requirements to ensure the pipeline and ancillary facilities were operated in a manner that would protect the safety of workers and protect the public from sudden ruptures and slow degradation of the pipeline. A ROW grant would be suspended or terminated for noncompliance with these requirements.

The key federal regulation ensuring the safe operation of petroleum product pipelines through design, construction, and operation standards is the U.S. Department of Transportation 49 CFR Part 195 – Transportation of Hazardous Liquids by Pipeline: Minimum Federal Safety Standards. Federal regulations governing pipeline operation and maintenance specify the pipeline's acceptable operating pressure, require personnel training, and require operators to perform inspection, monitoring, and testing to ensure that the pipeline operates in a safe manner and to minimize the chance of spills. Other regulations are included in under 49 CFR Part 194 (federal requirements for emergency response plans for onshore oil pipelines) and 40 CFR Parts 109, 110, 112, 113, and 114 (federal requirements for Spill Prevention, Control, and Countermeasures Plans). The Oil Pollution Act (OPA 90) and the Oil Pollution Liability and Compensation Act of 1989 are additional laws providing cleanup authority, penalties, and liability for oil spills.

Recent legislation had been enacted that substantially broadens the OPA regulatory authority to ensure hazardous liquid pipelines are maintained and operated in a safe manner, particularly in high consequence areas (i.e., high-density population areas, water where commercial navigation currently exists, and areas unusually sensitive to environmental damage). Portions of the East Line Expansion Project are subject to this "Integrity Management Rule for High Consequence Areas." The regulation will result in increased inspection, enhance damage prevention, improve emergency response, and other measures to prevent and mitigate pipeline leaks. The Office of Pipeline Safety (OPS) is responsible for enforcement and emphasizes their responsibility and commitment to this program (65 FR 75378).

With the exception of the No Action Alternative, all alternatives would be governed by the same federal regulations, stipulations, and permitting process to ensure safe pipeline construction, operation, and maintenance and proper care for environmental resources. If approved, it is anticipated that SFPP would immediately begin construction activities and the new pipeline segments.

1.4.1 Internal Inspection

To determine the integrity of the pipeline, internal inspections of pipelines are completed by the use of internal inspection tools or "smart pigs".

Tools for internal pipeline inspection (referred to as "smart pigs") perform a wide variety of specific functions, such as geometric surveys, metal loss, and detecting cracks. A detailed geometric survey of the pipeline allows mapping of the interior curvature to help analyze stress and compatibility with other internal pigs. These surveys often include caliper tools to measure anomalous shapes.

In accordance with current Federal Regulations the East Line Pipeline System will be evaluated by either smart-pigging or hydro-testing by 2007, and will be re-evaluated every 5 years thereafter. Details regarding testing and integrity management protocol are described in the Kinder Morgan Integrity Management Program. Kinder Morgan prepared this program in 2002 in accordance with Federal Regulations and it has been reviewed by the Federal Office of Pipeline Safety. The 8-inch line between El Paso and Tucson was most recently smart-pigged in 2004. The 12-inch line between El Paso and Tucson was most recently smart-pigged in 1998. The 12/8-inch multi-diameter line between Tucson and Phoenix was most recently smart-pigged in 2004.

Non-Destructive Testing. Internal inspection is used primarily to ensure mechanical integrity of pipelines after installed, prior to or during operation. However, other non-destructive testing methods ensure mechanical integrity of the pipe material used during fabrication and installation prior to operation. During pipe manufacturing, 100 percent of the pipe seam welds are inspected using ultrasonic instruments. During construction, 100 percent of the pipeline girth welds are inspected using radiographic and ultrasonic methods among others.

Hydrostatic Testing. Hydrostatic pressure testing is another method employed by operators to ensure the mechanical integrity of the pipelines. The requirements for pressure testing of pipelines are outlined in 49 CFR § 195.302 General requirements. During a hydrostatic pressure test, the pipeline is filled with water, pressure is increased inside the pipeline and held for a duration in accordance with 49 CFR § 195.304 Test pressure.

Defects detected during testing with any of the abovementioned methods are located and corrected before putting any new pipeline in operation. SFPP maintains records of hydrotest and weld inspection reports as long as the pipeline is in service, and are available for review by the OPS in accordance with 49 CFR § 195.310 Records. To the extent required by Federal, State, and Local Regulation, SFPP will provide records of leaks and/or accidents to all applicable agencies.

1.4.2 Summary of Pipeline Operations

The operations of pipelines for transportation of hazardous liquids is regulated by the U.S. Department of Transportation under 49 CFR §195, "Transportation of Hazardous Liquids by Pipeline". This part of the federal code prescribes the safety standards and reporting requirements under this rule.

1.4.2.1 Operations

The discussion of operations outlined in the following paragraphs is specific to the operation of the new pipelines as described in the proposed action in this report. However, given that the new pipelines are part of a larger transportation system, some sections would be applicable to the entire pipeline system.

Operating Flow Rates. The projected maximum flow rate for the 16-in/12-in pipeline system is 5,854 barrels per hour (bph), and 112,850 barrels per day (bpd) based on a 20.9-hour operating day. The projected maximum flow rate for the 12-in/8-in pipeline system is 2,338 bph, and 35,160 bpd based on a 22.9-hour operating day. The flow rates will vary depending on the type and quantity of product being transported, but will likely not exceed the maximum projected flow rate.

Operating Pressures. The new 16-inch and 12-inch pipeline system is designed to have a maximum operating pressure of 1,440 pounds per square inch (psi) in accordance with 49 CFR §195.106 internal design pressure. However, the pipeline will not be operated at a pressure that exceeds the established maximum allowable operating pressure (MAOP) in accordance with 49 CFR §195.406 maximum operating pressure.

Operation and Maintenance. SFPP operates and maintains their pipeline systems in accordance with the requirements specified in 49 CFR §195, Subpart F – Operation and Maintenance. This subpart prescribes minimum requirements for operating and maintaining pipeline systems constructed with steel pipe.

1.4.2.2 Pipeline Safety and Integrity Management

SFPP is currently in compliance with the requirements of the OPS regarding integrity management. Existing pipelines have been constructed to be in compliance with federal regulations governing pipeline design and construction.

Existing pipelines are currently inspected, maintained, and operated per the requirements of the federal regulations and OPS's integrity management requirements. This includes an assessment of the existing and new pipeline segments to determine sensitive areas as defined by OPS. SFPP has determined that no new upgrades, repairs, or reconditioning will be required on the existing pipelines to allow operation of the new pipeline systems under new operating conditions. SFPP's assessment is based on the most recent evaluations of the pipeline completed under the integrity management program.

1.5 Public Involvement

An integral and ongoing element of an EA as required under NEPA is informing and involving interested and affected members of the public, a process known as *scoping*. Early in the development of this EA, governmental agencies, county and municipal offices, and environmental groups were contacted and informed of the proposed project. On July 2, 2004, a scoping notice was mailed to approximately 350 property owners, public agencies, interested parties, and other organizations and agencies. This notice described the Proposed Action and its purpose and need as well as solicited comments, concerns, and issues pertaining to the Proposed Action. Appendix A contains comments received from various agencies, organizations, and the public. A press release and legal notice were distributed to key local and regional media for publication over the weekend beginning on July 2, 2004, or in the weekly edition for nondaily publications. The following publications contained the press release and legal notice:

- *El Paso Times* (El Paso, Texas)
- *Las Cruces Sun* (Las Cruces, New Mexico)
- *Deming Headlight* (Deming, New Mexico)
- *Arizona Range News* (Benson, Arizona)
- *Arizona Daily Star* (Tucson, Arizona)
- *Arizona Republic* (Phoenix, Arizona)
- *Tucson Weekly* (Tucson, Arizona)
- *Casa Grande Dispatch* (Casa Grande, Arizona)
- *Maricopa Monitor* (Maricopa, Arizona)

1.6 Conformance with Existing Plans, Statutes, or Other Regulations

This EA has been developed and prepared in accordance with NEPA, as amended (42 USC 432 et seq.). In addition, this project would be in conformance with the existing BLM land management plans and would comply with applicable federal, state, county, and city laws and regulations. Table 1.6-1 contains the various federal, state, and local agencies that would be consulted during various stages of the proposed project.

TABLE 1.6-1
Interagency Coordination
SFPP East Line Expansion Project

Agency	Contact
Federal Agencies	
Bureau of Land Management New Mexico-Texas-Oklahoma-Kansas	Project Lead and Contact Lorraine J. Salas 1800 Marquess Las Cruces, NM 88005 Field Manager Edwin Roberson 1800 Marquess Las Cruces, NM 88005 Project Archeologist John Thacker 1800 Marquess Las Cruces, NM 88005 Project Wildlife Management Biologist Bill Merhege 1800 Marquess Las Cruces, NM 88005 Project Management Biologist Margie Guzman 1800 Marquess Las Cruces, NM 88005
Bureau of Land Management Arizona State Office	Point of Contact Keith Moon 222 N. Central Ave. Phoenix, AZ 85004 Tel. (602) 417-9200
Bureau of Land Management Safford Field Office	Point of Contact Scott Evans 711 14th Ave. Safford, AZ 85546-3321 Tel. (928) 348-4414 Endangered Species Coordination for Arizona Ted Cordery Arizona State Office 222 N. Central Ave. Phoenix, AZ 85004 Tel. (602) 417-9242 Coordination with Phoenix Field Office Cheryl Blanchard Phoenix Field Office 21605 N. 7th Ave. Phoenix, AZ 85027-2099 Tel. (623) 580-5500

TABLE 1.6-1
Interagency Coordination
SFPP East Line Expansion Project

Agency	Contact
U.S. Department of Defense Ft. Bliss	Bill Tipton, Realty Officer USAADACENFB ATZC-ISE-P; Tiptonb Fort Bliss, TX 79916-6812
U.S. Fish and Wildlife Service	Steven L. Spangle, Field Supervisor Arizona Ecological Services Office 2321 West Royal Palm Rd., Suite 103 Phoenix, AZ 85021-4951 Tel. (602) 242-0212 Sherry Barrett, U.S. Fish and Wildlife Service Arizona Ecological Services Field Office 10 South Church St., Suite 3450 Tucson, AZ 85701
U.S. Army Corps of Engineers	Cindy Lester, USACE Regulatory Branch 3636 North Central Ave., Suite 760 Phoenix, AZ 85012-1936 Daniel Malanchuk, Chief, Regulatory Branch Albuquerque, NM Office of USACE Regulatory Branch 4101 Jefferson Plaza NE Albuquerque, NM 87109-3435 Tel. (505) 342-3282
U.S. Environmental Protection Agency (Region 6 and 9)	USEPA Region 6 1445 Ross Ave. , Suite 1200 Dallas, TX 75202 USEPA Region 9 75 Hawthorne St. San Francisco, CA 94105
Bureau of Indian Affairs	Davis Pecusa, Director Bureau of Indian Affairs, Pima Agency P.O. Box 8 Sacaton, AZ 85247 Pete Overton, Environmental Department Bureau of Indian Affairs, Pima Agency Julia Molina, Realty Department Bureau of Indian Affairs, Pima Agency

Table 1.6-1
Interagency Coordination
SFPP East Line Expansion Project

Agency	Contact
Gila River Indian Community	Governor Richard P. Narcia Gila River Indian Community P.O. Box 97 Sacaton, AZ 85247
	Elaine Blackwater, Land Use, Planning and Zoning Gila River Indian Community 192 South Skill Center Rd., Suite 200 Sacaton, AZ 85247
	George Brooks Jr., Environmental Coordinator Pima-Maricopa Irrigation Project 192-A South "A" St. Sacaton, AZ 85247 Tel. (520) 562-6706
State Agencies	
Texas Parks & Wildlife	Kathy Boydston, Wildlife and Endangered Species Texas Parks and Wildlife Department 4200 Smith School Rd. Austin, TX 78744 Tel. (512) 389-4638
New Mexico Department of Game and Fish	Jan Ward One Wildlife Way Santa Fe, NM 87507 Tel. (505) 476-8114
	Lisa Kirkpatrick, Division Chief Conservation Services Division New Mexico Department of Game and Fish P.O. Box 25112 Sante Fe, NM 87504
Arizona Game and Fish Department	Sabra S. Schwartz Heritage Data Management System, Coordinator 2221 West Greenway Rd. Phoenix, AZ 85023-4399 Tel. (602) 789-3618
Texas Commission on Environmental Quality	Kent Waggoner, Waste Investigator 401 E. Franklin Ave., Suite 560 El Paso, TX 79901-1206
New Mexico State Land Office	Debra Padilla P.O. Box 1148 Santa Fe, NM 87504-1148
Arizona Department of State Lands	James Rees, ROW Administrator 1616 W. Adams Phoenix, AZ 85007 Tel. (602) 542-3115

TABLE 1.6-1 (CONTINUED)
Interagency Coordination
SFPP East Line Expansion Project

Agency	Contact
New Mexico Environment Department	Ted Schooley, Construction & Air Quality Permits Manager Air Quality Bureau 2048 Galisteo Street Santa Fe, NM 87505 Tel. (505) 827-1494; (505) 955-8088 Daniel Guevara, Environmental Scientist/Specialist Surface Water Quality Bureau, Sec 401 Certification Program 1190 St. Francis Dr., P.O. Box 26110 Santa Fe, NM 87502 Tel. (505) 476-3017
Arizona Department of Environmental Quality	Manuel C. Padilla Office of Water Quality, Federal Permits Unit 1110 W. Washington Phoenix, AZ 85007
Arizona Department of Water Resources	Scott Miller Phoenix Active Management Area 500 N. 3rd St. Phoenix, AZ 85004
New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division	Martyne Kieling, Oil Conservation Division (Hydrostatic Testing Discharge Permit) P. O. Box 6429 1220 South St. Francis Dr. Santa Fe, NM 87505 Tel. (505) 476-3488
Arizona State Historic Preservation Office	SHPO, Arizona State Parks 1300 W. Washington Phoenix, AZ 85007
New Mexico State Historic Preservation Office	Department of Cultural Affairs Historic Preservation Division 228 East Palace Ave., Room 320 Santa Fe, NM 87501
Texas State Historic Preservation Office	Texas Historical Commission P.O. Box 12276 Capitol Station Austin, TX 78711
Arizona Department of Transportation	Sylvia Hanna, Permit Supervisor Tucson District Permits 1221 S. 2nd Ave. Tucson, AZ 85713-1602 Tel. (520) 620-5452 Fax (520) 620-5444

TABLE 1.6-1 (CONTINUED)
Interagency Coordination
SFPP East Line Expansion Project

Agency	Contact
New Mexico Department of Transportation	John Rocha, Railroad and Utilities Section Head NM DOT Railroad and Utilities 1120 Cerrillos Rd. P.O. Box 1149 Santa Fe, NM 87504-1149 Tel. (505) 827-1683 Gwyneth Duncan P.O. Box 1149, Room 213 Santa Fe, NM 87504-1149 Tel. (505) 827-5235
Texas Department of Transportation	Albert Martinez, ROW Agent Maintenance Department 13301 Gateway Blvd West El Paso, TX 79928-5410 Tel. (915) 790-4369 Leo Bettencourt, Director of Maintenance Tel. (915) 790-4319
County and Local Agencies	
El Paso County Department of Roads and Bridges	Louie Rodriguez, ROW Technician Roads and Bridges 500 E. San Antonio. Suite 404 El Paso, TX 79901
Dona Ana County Flood Commission	Paul Dugie, Director 251 W. Amador Las Cruces, NM 88001 Tel. (505) 647-7256
Luna County Planning Department	Phillip Butz, Director P.O. Drawer 551 Deming, NM 88031-0551
Grant County Manager's Office	Dolores Domingez, Ordinance Officer P.O. Box 898 Silver City, NM 88061
Cochise County Highway and Floodplain Department	Mike Engers, Flood Control Technician 1415 W. Melody Ln., Bldg B Bisbee, AZ 85603
Pima County Dept. of Environmental Quality	130 West Congress, 3rd Floor Tucson, AZ 85701
Maricopa County Environmental Services Department	Lucinda Swann, Earth Moving Permits Manager Air Quality Division 1001 N. Central Ave., Suite 200 Phoenix, AZ 85004 Tel. (602) 506-6734

TABLE 1.6-1 (CONTINUED)
Interagency Coordination
SFPP East Line Expansion Project

Agency	Contact
City of El Paso Engineering Department	Basher Abugalyon, P.E., Chief of Engineering 2 Civic Center Plaza 4^{th} Floor Engineering Department El Paso, TX 79901-1196 Tel. (915) 541-4200
City of El Paso Planning Department	Kimberly Foresyth, Urban Planner Planning 2 Civic Center Plaza El Paso, TX 79901 Tel. (915) 541-4631

1.7 Summary of Required Permits and Approvals

Table 1.7-1 summarizes the required permits and approvals by granting agency. The table is divided into three sections: Federal, State, and County and Local.

TABLE 1.7-1
List of Permits and Approvals
SFPP East Line Expansion Project

Permit/Approval	Granting Agency
Federal	
MLA Right-of-Way Grant	Bureau of Land Management
NEPA Compliance	Bureau of Land Management
National Historic Preservation Act–Section 106 Compliance	Bureau of Land Management
ESA Section 7 Consultation	U.S. Fish and Wildlife Service
Clean Water Act (CWA) Section 404 Permit	U.S. Army Corps of Engineers
National Pollutant Discharge Elimination System (NPDES) Stormwater Plan and Notice of Intent	U.S. Environmental Protection Agency (Regions 6 and 9) (Potentially) Arizona Dept of Environmental Quality
Archeological Resource Protection Act (ARPA) Permit	Bureau of Indian Affairs
Right-of-Way (ROW) Grant for allotted Tribal Lands	Bureau of Indian Affairs
Bureau of Indian Affairs (BIA) Road Department	Bureau of Indian Affairs
ROW Grant for Tribal Lands	Gila River Indian Community
Threatened and Endangered Species, Tribal Lands	Gila River Indian Community
Native Plant Ordinance	Gila River Indian Community
Archaeological Clearance, Tribal Lands	Gila River Indian Community

TABLE 1.7-1
List of Permits and Approvals
SFPP East Line Expansion Project

Permit/Approval	Granting Agency
State	
ROW Grant	New Mexico State Land Office
	Arizona Department of State Lands
Threatened and Endangered Species Consultation	New Mexico Department of Game and Fish
	Arizona Department of Game and Fish
Section 401 (CWA) Water Quality Certification	New Mexico Environmental Department
	Arizona Department of Environmental Quality
	Texas Commission on Environmental Quality (TCEQ)
Above Ground Storage Tank Registration (TCEQ-0724)	Texas Commission on Environmental Quality (TCEQ)
Cultural Resources Clearances	New Mexico State Historic Preservation Office
	Arizona State Historic Preservation Office
	Texas Historic Preservation Office
	Gila River Indian Community Tribal Historic Preservation Office
Arizona Native Plant Law Compliance	Arizona Department of Agriculture
Encroachment Permit for Crossing State Highways	Arizona Department of Transportation
	New Mexico Department of Transportation
	Texas Department of Transportation
Construction Dewatering Permit	New Mexico Environmental Department –Surface Water Quality Bureau
	Arizona Department of Environmental Quality
	Texas Commission on Environmental Quality
Hydrostatic Test Discharge	USEPA Region 9 (submitted to Arizona Department of Environmental Quality)
County and Local	
Erosion Control Permit	El Paso County, TX
Dig Permit	Fort Bliss, TX
Building Permit	City of El Paso, TX
	Pima County, AZ
	City of Phoenix, AZ
	City of Deming, NM

TABLE 1.7-1 (CONTINUED)
List of Permits and Approvals
SFPP East Line Expansion Project

Permit/Approval	Granting Agency
Grading Permit	City of El Paso, TX
Flood Control Permit	Dona Ana County, NM
	Cochise County, AZ
Floodplain Development Permit	Luna County, NM
Floodplain Permit	Grant County, NM
	Pinal County, AZ
Planning Department	Hidalgo County, NM
Non-Residential Permit	Cochise County, AZ
Air Quality Activity Permit	Pima County, AZ
Encroachment Permit	City of Eloy, AZ (Picacho School Rd.)
	Pinal County, AZ (51st Ave.)
	City of Maricopa, AZ (Lewis St., Edwards Ave.)
Earth Moving Permit	Maricopa County, Arizona

SECTION 2.

Proposed Action and Alternatives

SECTION 2

Proposed Action and Alternatives

This section describes the Proposed Action and Alternatives that were developed by SFPP after a detailed review of the existing route and potential expansion alternatives: (1) the Proposed Action, (2) Applicant Proposed Impact Avoidance and Minimization Measures, (3) Alternatives Considered but Eliminated from Further Analysis, and (4) the No Action Alternative.

2.1 Proposed Action

The Proposed Action is the installation of approximately 167 miles of 16-inch-diameter pipeline and 66 miles of 12-inch-diameter pipeline adjacent to existing 8- and 12-inch-diameter pipelines. The replacement segments traverse three states: Texas, New Mexico and Arizona. The Proposed Action also would include a breakout station, pump stations, terminals, valves, and meters. Location maps illustrating the proposed route can be seen in Figures 2.1-1 to 2.1-3. SFPP has determined that no new upgrades, repairs, or reconditioning will be required on the existing pipelines to allow operation of the new pipeline systems under new operating conditions.

The Proposed Action has been reviewed and conforms to the BLM Resource Management Plans (RMPs) identified below:

- Mimbres Resource Area, RMP, April 1993
- Final Safford District RMP and Environmental Impact Statement, August 1991

2.1.1 Description of Proposed Pipeline Replacement Segments

This section describes the location of the proposed pipeline segments and ancillary facilities in relation to the existing 8-inch and 12-inch pipelines, as well as the Union Pacific Railroad (UPRR) and adjacent highways. The mileposts referenced for Segments 2, 3, and 4 are based on the existing 12-inch pipeline from El Paso to Tucson and the 8-inch and 12-inch pipelines from Tucson to Phoenix, Arizona. The mileposts referenced for Segment 1 are based on the origin of the new pipeline. The mileposts listed are for reference only and may not correspond to the mileposts along the existing and/or proposed pipelines.

2.1.1.1 Segment 1

Segment 1 (Figure 2.1-1) is defined as the Diamond Junction to Breakout Segment and includes the installation of a new 16-inch pipeline between milepost (MP) 0.00 at the existing Diamond Junction facility and MP 6.20 at the proposed breakout facility, totaling 6.2 miles. From Diamond Junction, the proposed pipeline follows existing pipelines northwesterly through Fort Bliss. After approximately 5.5 miles, the line crosses the UPRR and terminates at the proposed breakout facility.

FIGURE 2.1-1
Location Map-Texas

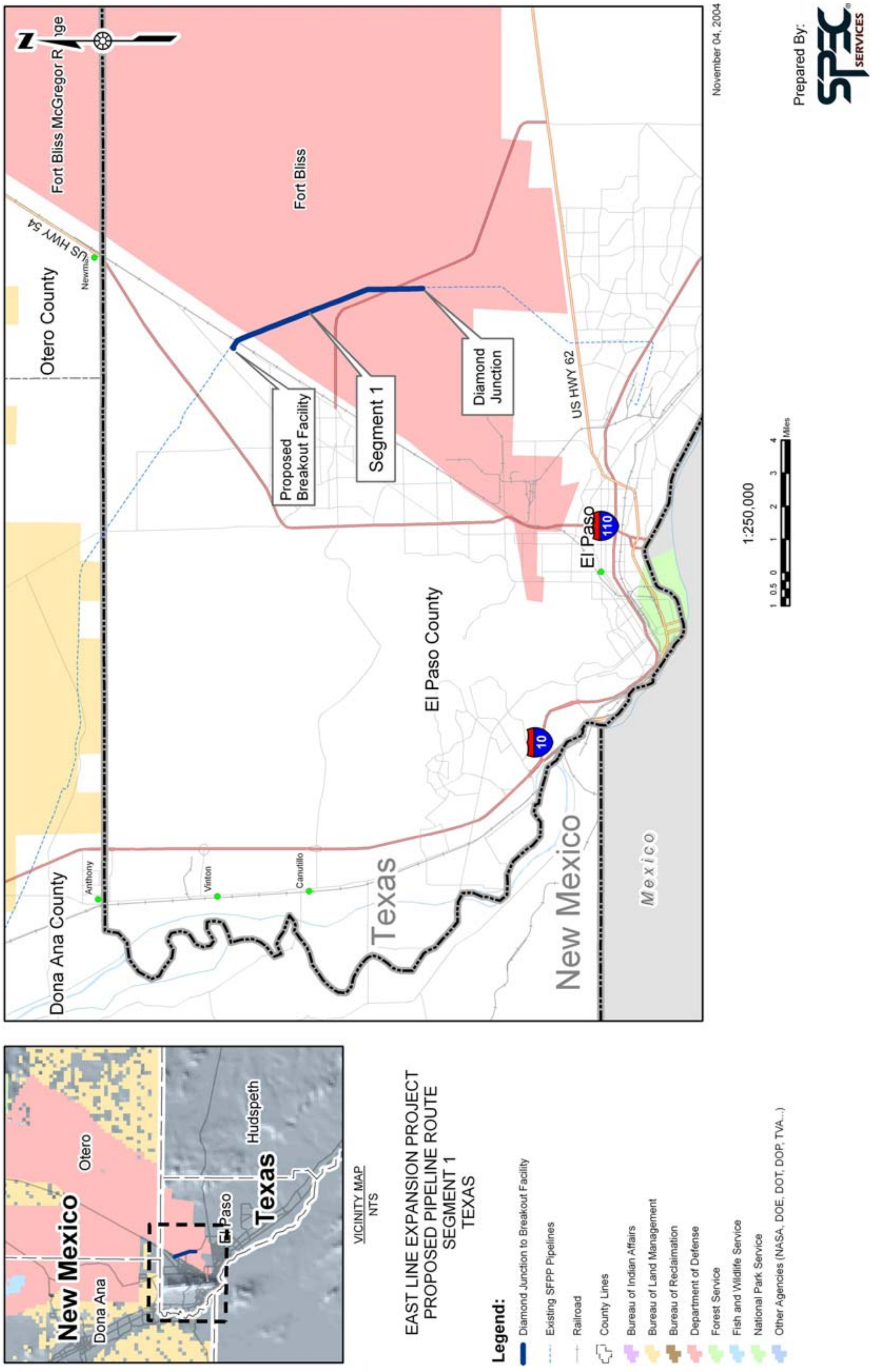


FIGURE 2.1-2
Location Map New Mexico

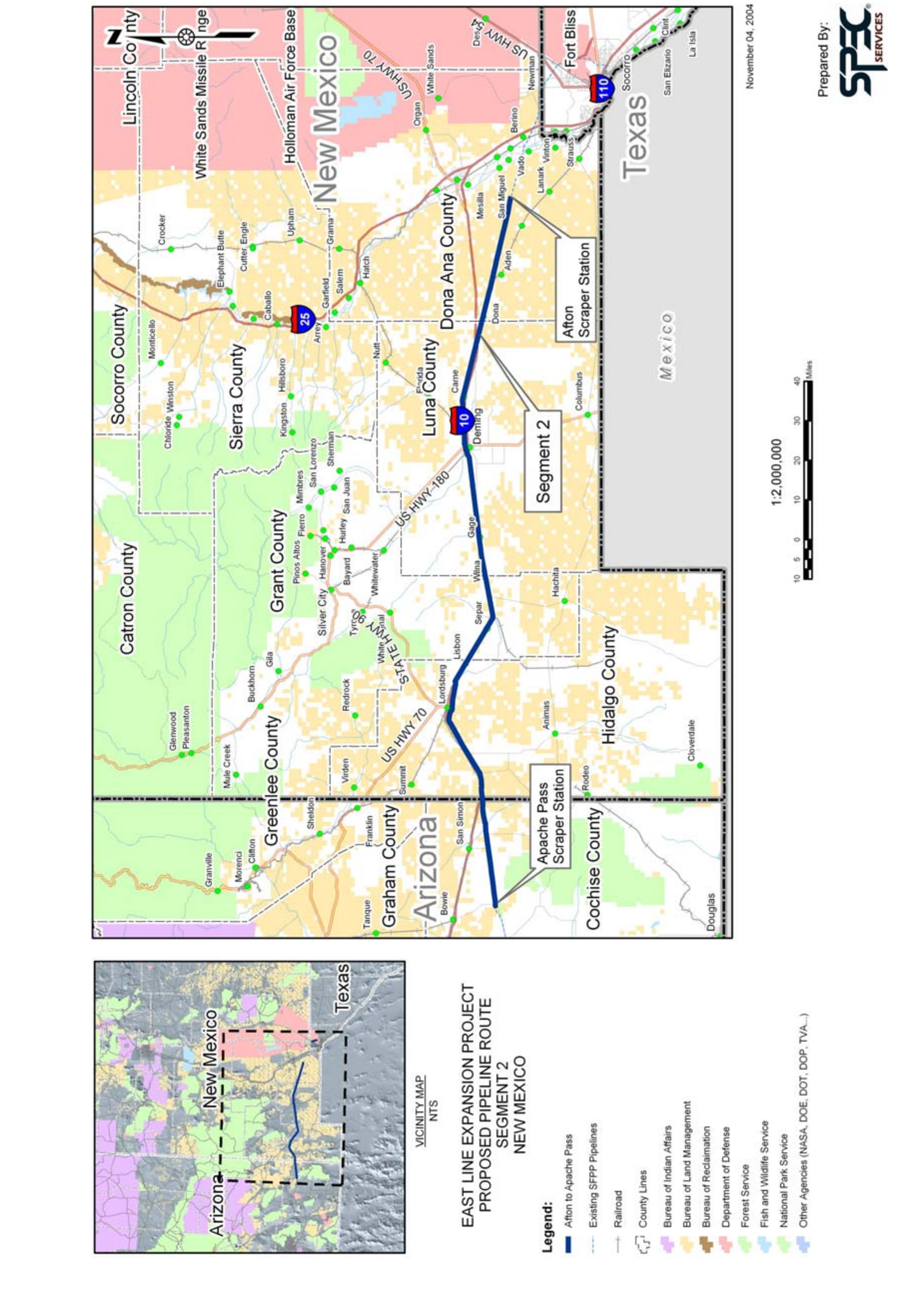
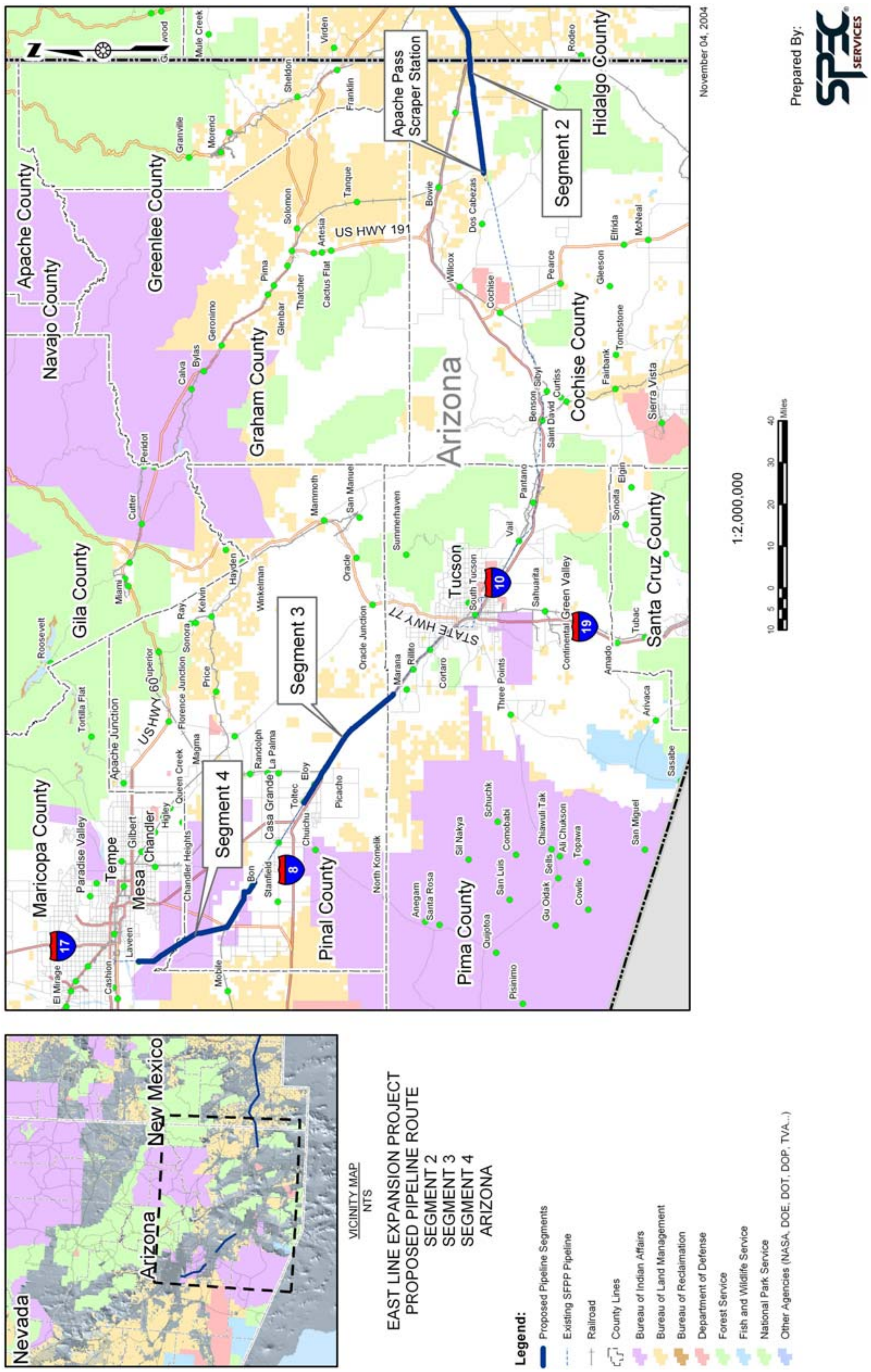


FIGURE 2.1-3
Location Map Arizona



2.1.1.2 Segment 2

Segment 2 (Figures 2.1-2 and 2.1-3) is defined as the Afton to Apache Pass Segment and includes the portion of the proposed 16-inch pipeline between MP 46.7 and MP 207.8 at the Apache Pass Valve Station, totaling 161 miles. Segment 2 is the only segment that extends between two states. Segment 2 begins in New Mexico and crosses the New Mexico/Arizona border at MP 184.6. The proposed pipeline follows existing pipelines along the north side. After approximately 25 miles, the line runs parallel to the UPRR for another 13 miles; at this point, it also parallels Interstate 10 (I-10). The line generally continues to follow the I-10 and UPRR corridor until separating for the last 23 miles, continuing along the existing pipeline to the Apache Pass Valve Station. There is one short, alignment reroute in the area of the Deming Station. This corridor is currently occupied by multiple El Paso Natural Gas and SFPP pipelines.

2.1.1.3 Segment 3

Segment 3 (Figure 2.1-3) is defined as the Marana to Toltec Segment and includes the portion of the proposed 12-inch pipeline between MP 335.8 and MP 367.07 (at the Toltec Pump Station), totaling 31.2 miles. This segment runs adjacent to I-10 and the UPRR corridor.

2.1.1.4 Segment 4

Segment 4 (Figure 2.1-3) is defined as the Bon to Dobbins Road Segment and includes the portion of the 12-inch pipeline between MP 386.81 (Bon) and MP 421.61 (Salt River), totaling 34.8 miles. The proposed route follows the existing pipeline except for a reroute through the City of Maricopa, Arizona, to avoid UPRR property. A large portion of this segment is within the Gila River Indian Community (GRIC). This segment crosses the Gila River.

2.1.2 Ancillary Facilities

Ancillary facilities to be constructed or modified include a new breakout facility, four existing pump stations, two existing terminals, new and existing valves as needed, cathodic protection test stations, and pipeline markers.

2.1.2.1 Breakout Facility

A new 35-acre breakout facility would be installed at approximately MP 6.2 (Figure 2.1-4). The facility would receive product from three inbound pipelines, accumulate the product in the tanks and ship product out on two outbound pipelines. Temporary storage and pumping would be the main activities at this terminal. New water, sewer, and electrical service would be installed to this facility.

Power to the El Paso breakout facility would be supplied by El Paso Electric via a 13.8-kilovolt (kV) system that originates at the El Paso Electric Milagro Substation located near the intersection of Electric Avenue and Fairbanks Drive in El Paso, Texas.

The system consists of existing 13.8-kV feeders that run for approximately 3,000 linear feet (lin ft) north along Electric Avenue. At the intersection of Electric Avenue and Donald Drive, the system turns east, runs adjacent to Donald Drive and turns northeast at the intersection of Donald Drive and Railroad Drive. The portion of the system that runs adjacent to Donald Drive is approximately 9,500 feet in length. With the exception of approximately 1,500 feet of wire near the Shearman Substation, all wire along this portion of the route is new.

At the intersection of Donald Drive and Railroad Drive, the new wiring is connected to existing wiring that runs adjacent to Railroad Drive. The system runs northeast along Railroad Drive until it intersects the property on which the El Paso breakout facility will be constructed. The length along Railroad Drive is approximately 8,750 feet long. Of this length, approximately 4,300 feet of wire starting at the intersection of Railroad Drive and Donald Drive exists. The remainder of the system into the breakout facility is new wiring.

2.1.2.2 Pump Stations and Terminals

There are six pump stations and terminals along the existing East Line pipeline system: El Paso Station, Deming Station, Lordsburg Station, Tucson Terminal, Toltec Station, and Phoenix Terminal.

Four pump stations and two terminals would be upgraded as part of this project to accommodate the increased capacity resulting from the proposed pipeline upgrades to a 16-inch-diameter pipe. The El Paso Station would require modification of its pumps; Deming Station would require pump upgrades and new electrical service; Tucson Terminal would require pump upgrades, metering, and piping upgrades and new electrical service; Phoenix Terminal would require metering and piping upgrades; and Lordsburg and Toltec would be decommissioned.

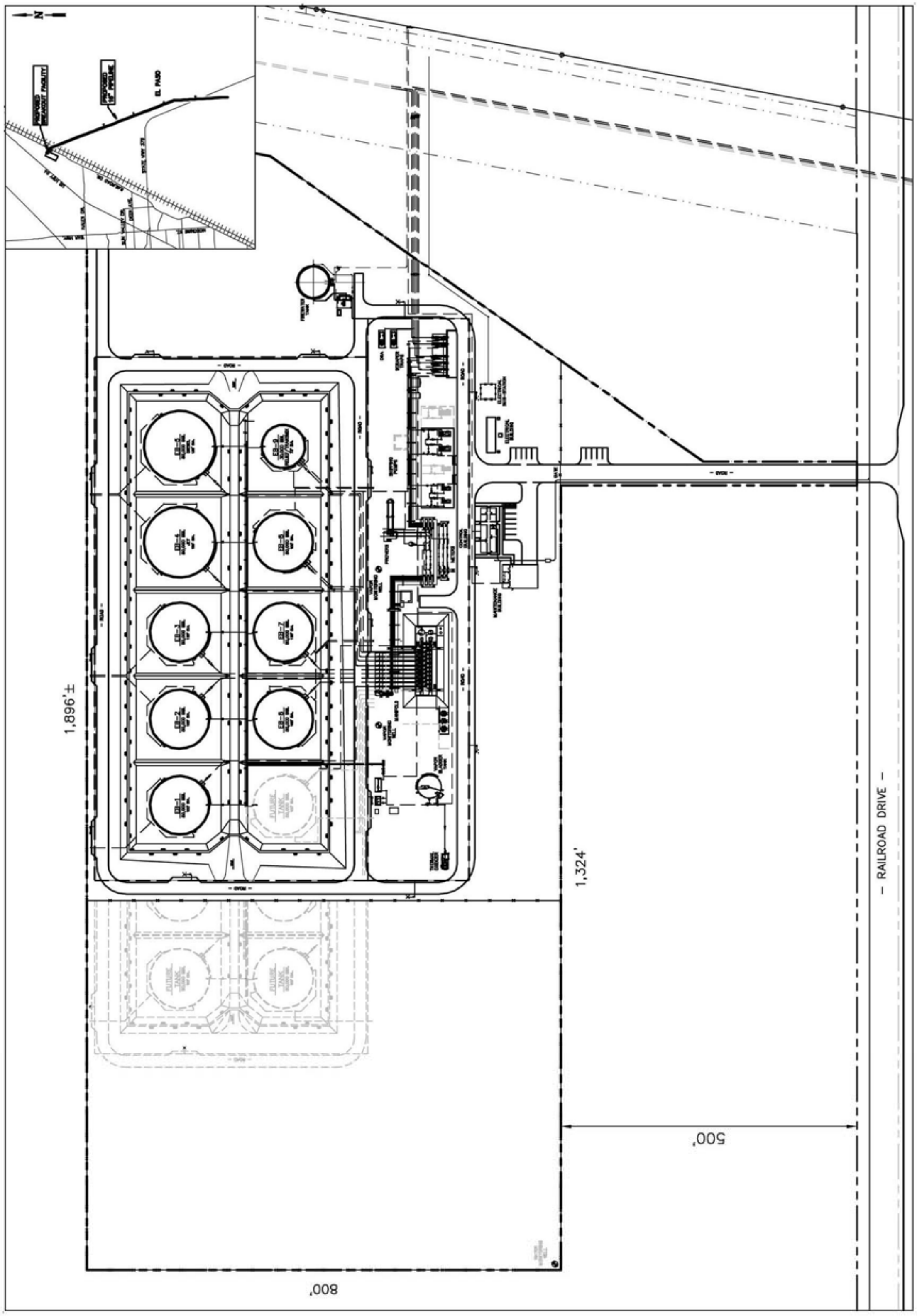
Power to the Deming Pump Station would be supplied by Public Service Company of New Mexico (PNM) via a new 115-kV power line that originates at the point where the new 16-inch pipeline intersects an existing 115-kV transmission system near the PNM Mimbres Substation in Deming, New Mexico. The 115-kV power line would be routed from this point approximately 4.5 miles to the Deming Pump Station. The power line route is adjacent and parallel to the proposed route for the new 16-inch pipeline.

Power to the Tucson Terminal would be supplied by Tucson Electric via a new 46-kV power line that would originate at an existing 46-kV line that runs parallel to Contractor's Way near the project site. The 46-kV power will be routed from this point approximately 160 feet due east to the northeast corner of the SFPP Tucson Terminal. The new power line would traverse railroad ROW before it crosses on to SFPP property.

2.1.2.3 Mainline Valves

Mainline valves are "welded-end" (i.e., no flanged or bolted connections) steel body valves that are used to isolate the pipeline for operation, maintenance, and emergency purposes. Mainline block valves are gate valves with gear operators that allow authorized pipeline workers to close and open the valve when needed. Mainline check valves are non-operated, one-way flow valves that prevent product from backflowing through the pipeline typically installed at the bottom of a significant hill. The valves are designed and manufactured to the requirements of 49 CFR Part 195, ANSI B31.4, API 6D and SFPP specifications.

FIGURE 2.1-4
Breakout Facility



Title 49 CFR Part 195 requires that liquid pipelines have sectionalizing valves throughout the length of the pipeline. The spacing requirements are a function of the pipeline's location and its proximity to sensitive environments as defined in 49 CFR §195.260. Given that much of the proposed alignment follows an existing pipeline that meets or exceeds those requirements, the valves for the proposed pipeline would be placed at or near those existing valve locations where feasible. In addition, new valves would be installed on the pipeline to reduce the distance between existing valves for operational and maintenance reasons.

A summary of new valve installation for each new segment follows:

Segment 1:	2 – Mainline Block Valves
Segment 2:	20 – Mainline Block Valves 6 – Mainline Check Valves
Segment 3:	2 – Mainline Block Valves
Segment 4:	5 – Mainline Block Valves

2.1.2.4 Scraper Stations

Two scraper stations, used for launching and receiving cleaning and inspection "pigs", would be installed at the start point and end point of Segment 2 of the proposed project. The stations are referred to as the Afton Scraper Station (MP 46.7) and Apache Pass Scraper Station (MP 207.8). New electrical utilities would be installed to the Apache Pass Scraper Station only.

2.1.2.5 Cathodic Protection Test Stations

To maintain and monitor the mechanical integrity of the pipeline, cathodic protection test stations would be installed at approximately 1-mile intervals. The test stations are used to measure the electrical potential between the pipe and the surrounding soil. These potential readings are used to determine the amount of electrical current required to be induced on the pipeline to mitigate the possibility for corrosion.

Test stations are typically installed aboveground within the pipeline ROW using a pipe topped by a small terminal box. The test leads (wires) are secured to the pipe underground and terminated at the test station, and are installed as required by 49 CFR §195.244.

The cathodic protection system will draw power from existing rectifiers now protecting the existing 8- and 12-inch pipelines. The new pipelines will be bonded to the existing pipeline to ensure a common bond and adequate distribution of current across all pipelines on the electrical circuit. No new power lines are needed to protect the new pipeline system. In general, cathodic protection test stations and appurtenances will not be fenced but will be located in an area that does not interfere with the use of the land and provides optimum protection from third-party damage.

2.1.2.6 Pipeline Markers

Pipeline markers will be installed to mark the approximate location of the pipeline centerline at 500-foot intervals so that they are clearly visible along the route. The yellow sign is posted approximately 4 feet above ground on a steel flange channel post with baked on yellow enamel finish. Figure 2.1-5 contains a detailed drawing with dimensions. In addition, markers will be placed at road, railroad, waterway, and foreign line crossings, and other places where excavating activities are likely as required by 49 CFR §195.410. The required size, color, and words shown on the markers are specified in 49 CFR §195.410.

2.1.3 Description of Construction Activities

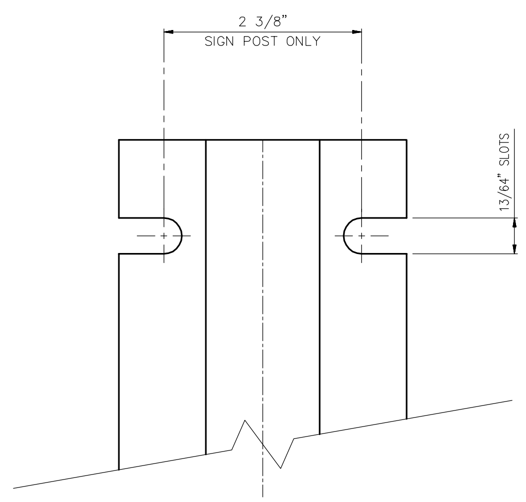
Temporary construction workspace or easements would typically be 100 feet wide while new permanent easements across public lands would be 30 feet wide. Some areas along the ROW would require workspace wider than 100 feet to allow for staging of materials or use of large construction equipment at highway and railroad crossings. Other areas would be less than 100 feet wide to avoid sensitive areas. A 200-foot-wide area along the entire project was examined for environmental clearance. All construction activities for the proposed breakout facility would occur within the 35-acre parcel. No additional workspace would be needed for the construction of this facility.

2.1.3.1 Preconstruction

The discussion of preconstruction activities outlined in the following paragraphs would be applicable to lands of all ownership types including federal, state, private, and/or tribal lands.

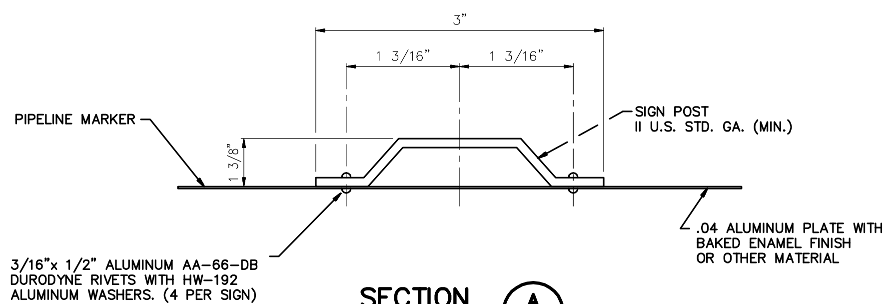
Staging Areas. Equipment, cable, and other construction material would be acquired from various vendors and stockpiled either at sites owned or leased by SFPP or in designated areas within the temporary construction easement. During the construction phase, materials for each day's activities would be stored in designated areas along the construction ROW. Upon cessation of construction activities in the evening and prior to any prolonged breaks in construction, heavy equipment would be secured along the ROW in a manner minimizing the threat to public safety, consistent with jurisdictional requirements. In roadways or in areas where pedestrian or vehicle traffic is present, provisions would be made to cover any open trenches to protect the public and wildlife.

Table 2.1-1 provides a nominal description of the location of the proposed laydown/staging areas in relationship to the existing 8-inch and 12-inch SFPP pipelines as well as the UPRR and adjacent highway ROWs. Pump stations and terminals also would be used for staging areas, including the proposed Breakout Facility, Deming Station, Lordsburg Maintenance Yard, Lordsburg Station, Toltec Station, Tucson Terminal, and Phoenix Terminal.



POST SLOT DETAIL
6 SLOTS REQ'D EACH POST

DETAIL 2
N.T.S.



SECTION A
N.T.S.

PIPELINE MARKER

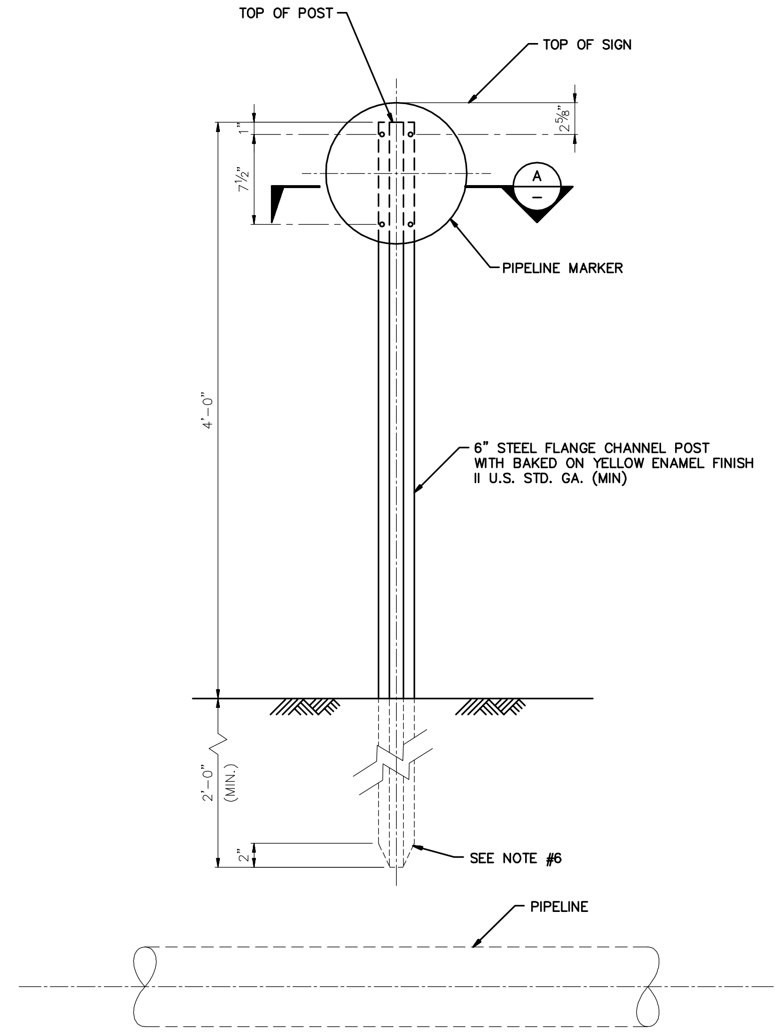
DETAIL 3
N.T.S.

FABRICATION NOTES

1. POSTS TO BE FURNISHED WITH FOUR SLOTTED HOLES AS INDICATED FOR ATTACHING PIPELINE MARKER.
2. PIPELINE MARKERS TO BE SUPPLIED WITH OR WITHOUT BLACK ARROW. FIGURES AND NUMBERS ON A YELLOW BACKGROUND.
3. PIPELINE MARKERS AND POSTS TO FURNISHED UNASSEMBLED. CONTRACTOR SHALL PROVIDE POP RIVETS AND GUN TO INSTALL SIGNS ON POSTS.
4. SIGN TO BE FURNISHED WITH FOUR HOLES AS INDICATED.
5. ARROW TO BE OMITTED ON SIGNS THAT ARE INSTALLED AT P.I.'S.
6. POSTS SHALL BE TAPERED ON ONE END TO FACILITATE DRIVING.

INSTALLATION NOTES

1. PIPELINE MARKERS TO BE LOCATED OVER PIPELINE WITH ARROW INDICATING THE ALIGNMENT OF THE PIPE. MARKERS LOCATED AT P.I.'S WILL HAVE NO ARROW.
2. MARKERS TO BE INSTALLED WITH SIGN FACING THE NORMAL TRAFFIC FLOW.



ELEVATION

DETAIL 1
N.T.S.

ISSUED FOR BID
JAN. 28, 2005

SPEC SERVICES
SPEC Services, Inc.
17101 Bushard Street
Fountain Valley, CA 92708
(714) 963-8077
K:\3100\ALIGN\GENERAL\3100_S912.8

NO.	DATE	DESCRIPTION	BY	CHECKED	APPROVED
A	01/28/05	ISSUED FOR BID	SPC	FIS	

REVISIONS

SFPP, L.P.
ORANGE CALIFORNIA

DRAWING TITLE: STANDARD DETAIL
JOB TITLE: EAST LINE EXPANSION
PIPELINE MARKERS DETAIL
LOCATION: NEW MEXICO & ARIZONA
OPERATING SYSTEM: EL PASO TO PHOENIX

FIELDBOOK XX			MAP REFERENCES		REF RECORD DWG NO: XXX-XXX-a.DWG
TWN	RNG	SEC	USGS QUAD	THOM. BROS.	CONSTRUCTION DRAWING NUMBER
			SERIES: 7.5"	PAGE: XX	3100-S-912
DATE: 01/20/05			NAME: XX	GRID: X#	

TABLE 2.1-1
Staging Areas

MP	Description
Segment 1–Diamond Junction to Breakout	
0	Diamond Junction
6.2	Proposed Breakout Facility
Segment 2–Afton to Apache Pass	
51.75	Afton Pump Station (no longer a pump station)
79	Lot Adjacent to I-10
80.5	Lot South of Existing Pipelines
N/A	Lot West of Highway 418 (Old ARSCO Plant)
107.6	Deming Station–Adjacent Property
158.47	Lordsburg Maintenance Yard
N/A	Lot Adjacent to I-10 and Highway 70
N/A	Lot Adjacent to UPRR Railroad
162.8	Lot North of Existing Pipelines
Segment 3–Marana to Toltec	
339.1	Lot North of Missile Base Road
345.1	Lot North of Park Link Road
367.07	Lot East Toltec Road
Segment 4–Bon to Dobbins Road	
398.8	Lot North of Hwy 238

Access Roads. Access to the proposed project would be by existing access roads to the pipeline or road ROWs used for the project. New access roads may be required for the project and have been identified in Table 2.1-2. Ingress/egress routes for ROWs that are not within the disturbed corridor of an existing road would be marked or flagged. Some existing roads in isolated areas may require minimal repairs to make them usable for construction. Heavy equipment and materials such as pipe, fittings, and valves would be transported on access roads. After completion of the pipeline installation, access roads would be repaired, as necessary. Except as noted in Table 2.1-2, new impacts would be within previously disturbed areas.

TABLE 2.1-2
Access Roads

MP	Description	New / Existing
Segment 1–Diamond Junction to Breakout		
0.8	Dirt Road	Existing
1.5	Army Road (dirt)	Existing
1.6	Dirt Road Existing	Existing
2.7	Dirt Road Existing	Existing
5.8	Dirt Road Existing	Existing
Segment 2–Afton to Apache Pass		
46.7	Afton Scraper Station Access (gravel)	New
47.7	Dirt Road	Existing
49.4	County Road B-007 (dirt)	Existing
51.8	Afton Station Access (dirt)	Existing
52.9	Dirt Road	Existing
55.7	Dirt Road	Existing
55.8	Dirt Road	Existing
56.8	Dirt Road	Existing
58.2	Dirt Road	Existing
63.4	County Road B-005 (dirt)	Existing
64.4	Dirt Road	Existing
66.1	County Road B-004 (dirt)	Existing
69.9	Railroad Surface Crossing	New
76.1	Dirt Road	Existing
80.2	Dirt Road	Existing
84.2	Dirt Road	Existing
89.2	Railroad Surface Crossing	New
93.6	Railroad Surface Crossing	New
100.7	Aquarius Drive (dirt)	Existing
100.8	Country Club Road (dirt)	Existing
101.4	Poppy Drive NE (dirt)	Existing
101.5	Lily Drive (dirt)	Existing
101.8	San Carlos Street (dirt)	Existing
102.1	Diamond Avenue (dirt)	Existing

TABLE 2.1-2 (CONTINUED)
Access Roads

MP	Description	New / Existing
102.4	Silver City Highway (paved)	Existing
102.8	West Eighth Avenue (paved)	Existing
103.2	Dirt Road	Existing
103.8	Peru Mill Road (paved)	Existing
104.0	2nd Street/Highway 494 (paved)	Existing
105.2	Belgian Road (dirt)	Existing
107.6	Deming Station Access (dirt)	Existing
109.7	Dirt Road	Existing
112.6	Dirt Road	Existing
114.3	Dirt Road	Existing
116.5	Paved Road	Existing
122.0	Dirt Road	Existing
127.6	Dirt Road	Existing
130.6	Dirt Road	Existing
135.3	Dirt Road	Existing
142.6	Dirt Road	Existing
151.3	Dirt Road	Existing
156.1	Dirt Road	Existing
156.8	Paved Road	Existing
158.5	Lordsburg Maint Station Access (paved)	Existing
162.1	Paved Road	Existing
162.3	Animas Road (paved)	Existing
162.8	Highway 494 (paved)	Existing
164.6	Dirt Road	Existing
168.7	Dirt Road	Existing
173.7	Highway 338 (paved)	Existing
179.0	Highway 80 (paved)	Existing
183.3	Dirt Road	Existing
186.1	Cavot Road (gravel)	Existing
189.7	Dirt Road	Existing
190.2	Riley Road (dirt)	Existing

TABLE 2.1-2 (CONTINUED)
Access Roads

MP	Description	New / Existing
192.3	Portal Road (paved)	Existing
194.3	North Parker Road (dirt)	Existing
195.3	Wood Canyon Road (paved)	Existing
207.0	Old Fort Bowie Road (dirt)	Existing
207.9	Apache Pass Road (dirt)	Existing
207.9	Apache Pass Scraper Station Access (gravel)	New
Segment 3–Marana to Toltec		
339.2	Missile Base Road (paved)	Existing
341.2	Temporary Railroad Surface Crossing	New
341.8	Private Road (paved)	Existing
345.3	Park Link Road (paved)	Existing
353.3	Dirt Road	Existing
357.2	Picacho School Road (paved)	Existing
358.1	Oak Lane (paved)	Existing
358.2	Pine Avenue (paved)	Existing
358.4	Vail Road (paved)	Existing
359.7	Dirt Road	
360.9	La Palma Road (paved)	Existing
362.3	Sunshine Blvd./Alsdorf Road (paved)	Existing
362.6	Main Street (paved)	Existing
363.5	Eleven Mile Corner Road (paved)	Existing
363.9	Battaglia Road (paved)	Existing
365.7	Houser Road (paved)	Existing
367.3	Toltec Road (paved)	Existing
Segment 4–Bon to Dobbins Road		
389.0	Anderson Road (paved)	Existing
389.1	Maricopa Casa Grande Highway (paved)	Existing
390.2	Peters and Nall Road (dirt)	Existing
391.1	Murphy Road (paved)	Existing
392.3	Hartman Road (dirt)	Existing

TABLE 2.1-2
Access Roads

MP	Description	New / Existing
394.7	White and Parker Road (paved)	Existing
395.9	Porter Road (paved)	Existing
398.4	John Wayne Parkway (paved)	Existing
398.8	Garvey Road (paved)	Existing
399.2	Edison Road (paved)	Existing
399.7	Highway 238 (paved)	Existing
413.2	Beltline Road (paved)	Existing
415.9	Pecos Road (dirt)	Existing
417.6	51^{st} Avenue (paved)	Existing

Marking the ROW and Survey Activities. Activities associated with project construction, operations and maintenance, as well as site restoration would be conducted within the authorized limits of the temporary construction easement and permanent ROW. Special or sensitive sites where construction equipment would not be allowed would be clearly marked before any construction or surface-disturbing activity begins. Construction personnel would be trained to recognize these markers and understand the equipment movement restrictions involved. Lath or flags would be maintained until final cleanup and/or reclamation is completed, after which they would be removed.

Construction zones would be marked with the appropriate warning signs and flags as required by federal, state, or local agencies having jurisdiction. Approved traffic control would allow continued access on important access roads.

Prior to and during construction, survey crews would collect field data required to finalize the construction design package and as-built package. These activities include but are not limited to

- Setting horizontal and vertical control for future coordinate basis
- Pipeline staking
- Staking of proposed facilities
- Surveying the installed pipeline

The duration of the surveys typically extends through the project design and permitting phase, construction phase, and project completion.

Site Preparation and ROW Clearing. Site preparation would not be necessary for areas within the cleared area of roads, cleared pipeline ROWs, and within roadways. Where installation occurs within the ROW but outside the cleared area, site preparation may include tree and brush removal and rock removal. Brush piles, chippings, and other cleared materials would be placed on the ROW to provide seed source and minimize off-highway vehicle traffic, or disposed of at approved landfills, or other approved sites traditionally used for disposal of construction debris. A temporary fence section (gap) would replace sections of existing fences that need to be removed for access.

Access to the ROW would be accomplished by using existing and new maintenance roads along the existing SFPP pipeline ROW. Primary access to these roads would be via I-10 and other existing roads and highways.

The clearing operation would require the use of bulldozers to enhance the existing grade to facilitate the use of the ROW for transportation of construction equipment and materials. This process includes the removal of vegetation. Large yuccas would be avoided to the extent possible. Yuccas to be avoided would be flagged prior to ROW clearing.

Transportation of Materials and Equipment to Project Site. The materials and equipment that would be transported for the pipeline include but are not limited to the following:

- Line pipe
- Pipe fittings
- Valves
- Miscellaneous communications instruments
- Fencing panels
- Electrical and lighting equipment
- Construction consumables (e.g., welding material, paint, wrapping material)

Materials and equipment required for the pump stations and terminals would be staged at the stations. Line pipe would be offloaded along the ROW or would be staged at designated areas along the route. Other materials and equipment would be delivered on palettes and would be offloaded with a forklift or crane. Transport and offload equipment would be stored within the cleared ROW or a designated staging area.

Cranes or “sidebooms” would be used for the pipeline and station construction; however, the contractor would be responsible for permitting any special transportation requirements from the respective highway agencies.

New line pipe will most likely be transported by railroad from the pipe mill to a siding location at Deming, New Mexico and Peoria, Arizona. Most other material and possibly the 12-inch mainline pipe would be transported by truck to the contractor's construction yard. Since a siding location will be used to unload the pipe, no fence will be required to be removed. After unloading at the railroad siding and storage at the offloading yard, the pipe would be transported by truck for stringing on the construction ROW.

2.1.3.2 Construction/Pipeline Installation

The following construction/pipeline installation activities outlined would be applicable to the entire project. Figure 2.1-6 illustrates a typical construction spread in urban areas.

Ditching. Typically, a 5- to 6-foot-deep ditch is excavated. However, the depth of the ditch can vary when special conditions are encountered that require additional depth. A typical trench would be 24 to 36 inches wide. The ditch would be excavated using trenchers and tracked and/or wheeled backhoes. An exception to the mechanical excavation would be

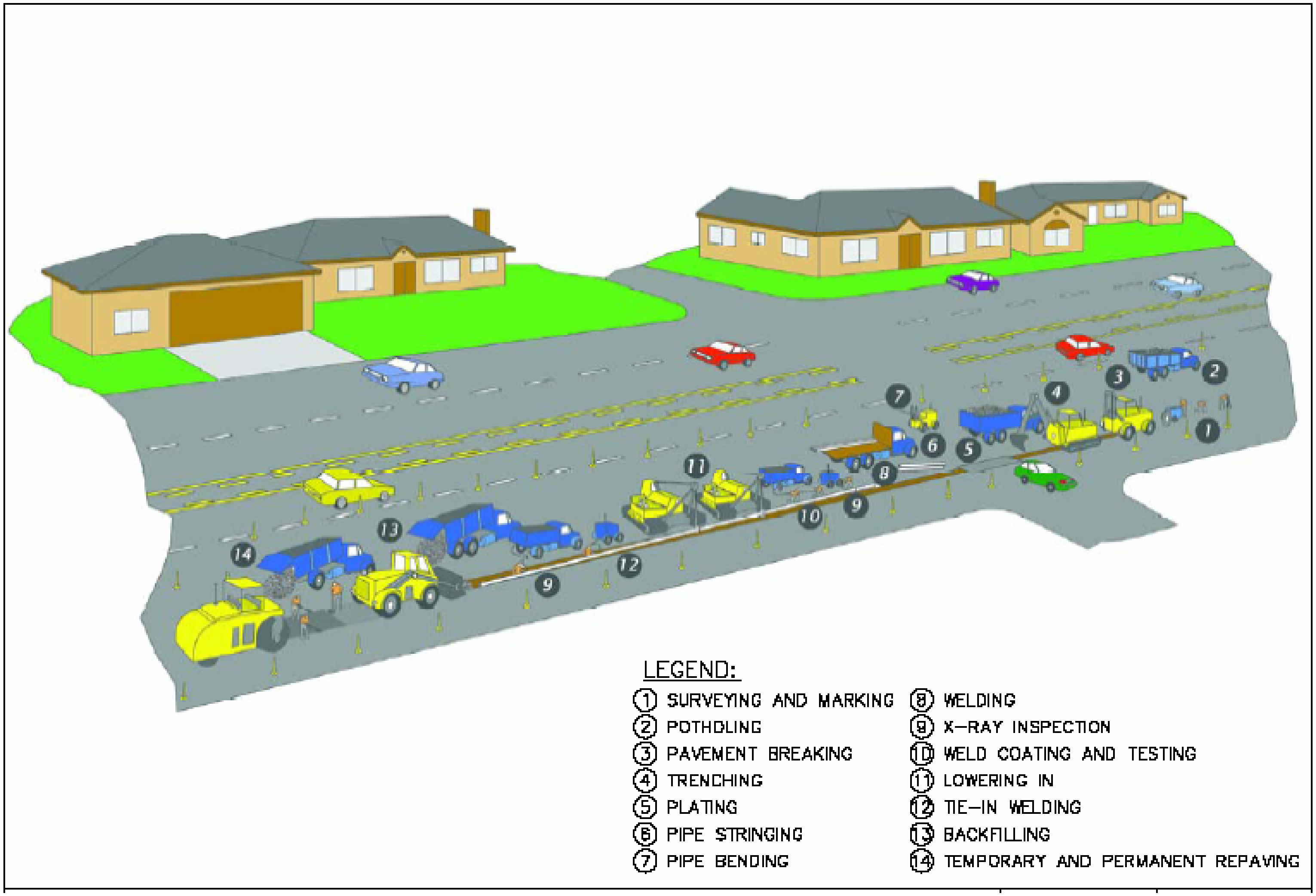


Figure 2.1-6 Typical Construction Spread in Urban Areas.

vacuum excavation or hand digging to locate buried utilities, such as other pipelines, cables, waterlines, and sewer lines. No blasting is anticipated. Water trucks would be used for dust control along the ROW for soil compaction. Figures 2.1-7 and 2.1-8 provide profiles of the temporary construction workspace in rural/desert areas and road and road shoulder areas, respectively.

The type of soils encountered would determine the type of equipment used for ditching. Harder soils such as caliche require larger trenchers and generally cannot be excavated using a backhoe.

Pipeline Handling and Stringing. Pipe would be transported and scheduled to be delivered along the pipeline ROW. The pipe would come in 40- to 80-foot lengths from the mill depending upon the specific requirements of the construction segment. Where sufficient space exists, pipe trucks would transport the pipe along the ROW, and sideboom tractors would unload the joints of pipe from the trucks and string them along the ditch end to end, ready for line-up and welding.

Construction ROW conditions may sometimes require pipe bends for which field bending would not be practical. In these cases, manufactured bends would be used. Where required, the pipe would be bent by a portable bending machine to fit the horizontal and vertical contour of the ditch.

Laying the pipe would involve use of special clamps that hold the pipe sections in position until the proper alignment is secured and welding can be performed. Following the line-up crew, the welding crew would apply the remaining weld passes to bring the thickness of the weld to more than the thickness of the pipe per Owner welding requirements.

Each welding crew would require a welding rig typically mounted on a pickup or flatbed truck. Each crew consists of a welder and a helper. The line-up crew utilizes a sideboom tractor to carry the internal line-up clamp. The crew consists of a sideboom operator and one or more laborers.

Pipe Coating. A protective coating would be applied on the pipe at the mill before delivery to the construction site. However, field coating would be necessary on all girth welds (joints) made at the site to provide a continuous layer of coating throughout the pipe. After the pipe has been welded and radiographically inspected (x-rayed), the uncoated girth weld is then coated with a heat shrinkable polyethylene sleeve, a field-applied fusion-bonded epoxy coating or alternatively, a primer and tape can be used as long as it provides adequate adhesion to the underlying coating and the bare pipe.

A detection test would be conducted along the pipe to determine if any coating discontinuities exist that could cause a concentrated point for corrosion. The testing device (holiday detector) generates an electrical potential between the pipe and an electrode in contact with the outside of the coating or ground. Pinholes in the coating of microscopic size can be located using the holiday detector. In the event pinholes or other damage to the coating is found, the testing crew would repair the coating by applying primer and tape, or other approved method of coating repair to securely cover the damage. All coated pipe, including field joints, fittings, and bends, would be tested and repaired as necessary. The pipe coating crew consists of two laborers. This crew typically utilizes a pickup truck to transport the coating materials.

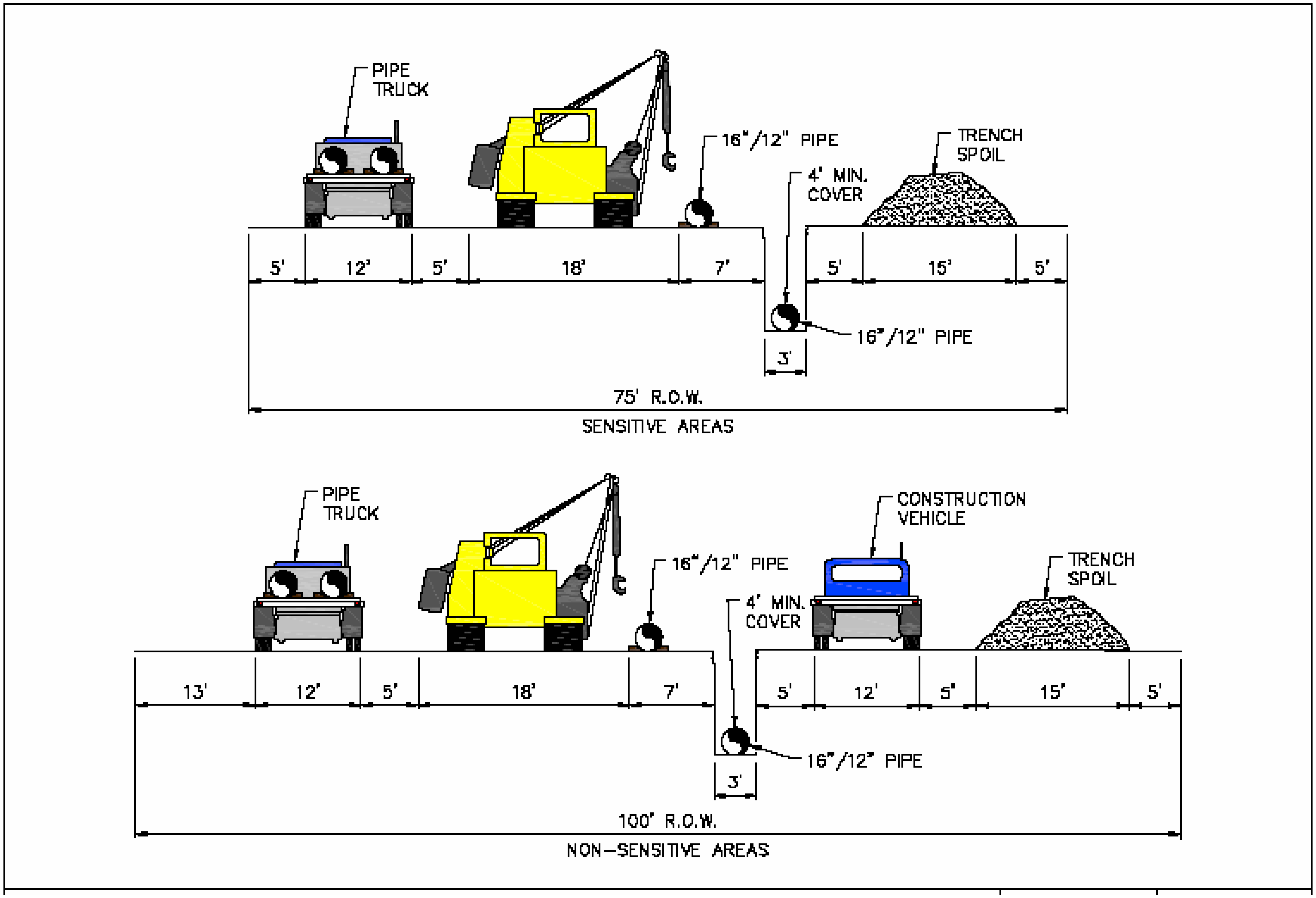


Figure 2.1-7 Temporary Construction Workspace in Rural/Desert Areas.

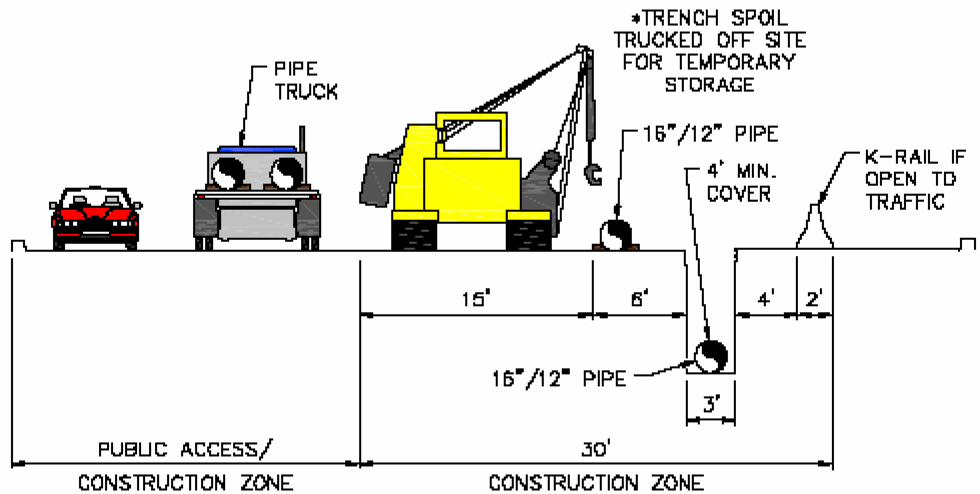


Figure 2.1-8 Temporary Construction Workspace in Road and Road Shoulder Areas.

Lowering and Backfilling. The pipe would be lifted and lowered into the ditch by sideboom tractors spaced so that the weight of the unsupported pipe would not cause mechanical damage. Cradles with rubber rollers or padded slings would be used so the tractors may lower the pipe without damaging the external coating as they travel along the ditch line. Ditch welds (tie-in welds) may be required whenever the ditch line is obstructed by other utilities crossing the pipe ditch. These welds would usually be made in the ditch at the final elevation, and each weld would require pipe handling for line-up, cutting to exact length, coating, and backfilling.

Backfill material would be obtained from the excavation ditch spoils. Spoils would generally be returned to the ditch soon after ditching. Figure 2.1-9 demonstrates a typical trench profile in earth and pavement. Spoils would be screened as the material is returned to the ditch using standard construction screening equipment such as a padder/shader. The pipe would be protected along the sides with a minimum of 12 inches of backfill also free of rocks. This zone is typically referred to as pipeline padding and shading. In certain areas where damage might occur to the pipe coating from abrasive soils, clean sand or earth backfill would be used to pad the pipeline. Any required padding material would be obtained from screened trench spoil or local commercial sources. The backfill remainder of the trench above the pipeline would be native material excavated during trenching.

At the time of backfilling, a colored warning tape is buried approximately 18 inches above the pipeline to indicate the presence of a buried pipeline to future third-party excavators.

In roadways, the backfilled soil would be compacted using a roller or hydraulic tamper before paving. When use of a mechanical device is not practical, sand slurry would be used as backfill to obtain the required compaction. Caliche or large rock material would be spread across the ROW or disposed of according to appropriate guidelines and landowner approval.

Cleanup and Restoration. The cleanup and restoration process would include removal of debris, construction signs, surplus material, and equipment from construction areas, followed by fence replacement, repaving of any disturbed roadways, and restoration of disturbed lands along the pipeline ROW. It also includes the daily removal of any trash left onsite. An archaeological monitor would be present to monitor during the soiling and screening process. Erosion and drainage control measures included in the Storm Water Pollution Prevention Plan (SWPPP) would be used where necessary to control erosion.

As part of this process, the ROW would be resurfaced so as to match the adjacent undisturbed grade ensuring that the normal drainage of rainwater is not compromised. Where reseeding is required, the ROW would be seeded with a certified weed-free native seed mixture not to exceed 15 pounds per acre.

Any range improvement such as fences or water lines that may be impacted would be restored to their original conditions by the contractor.

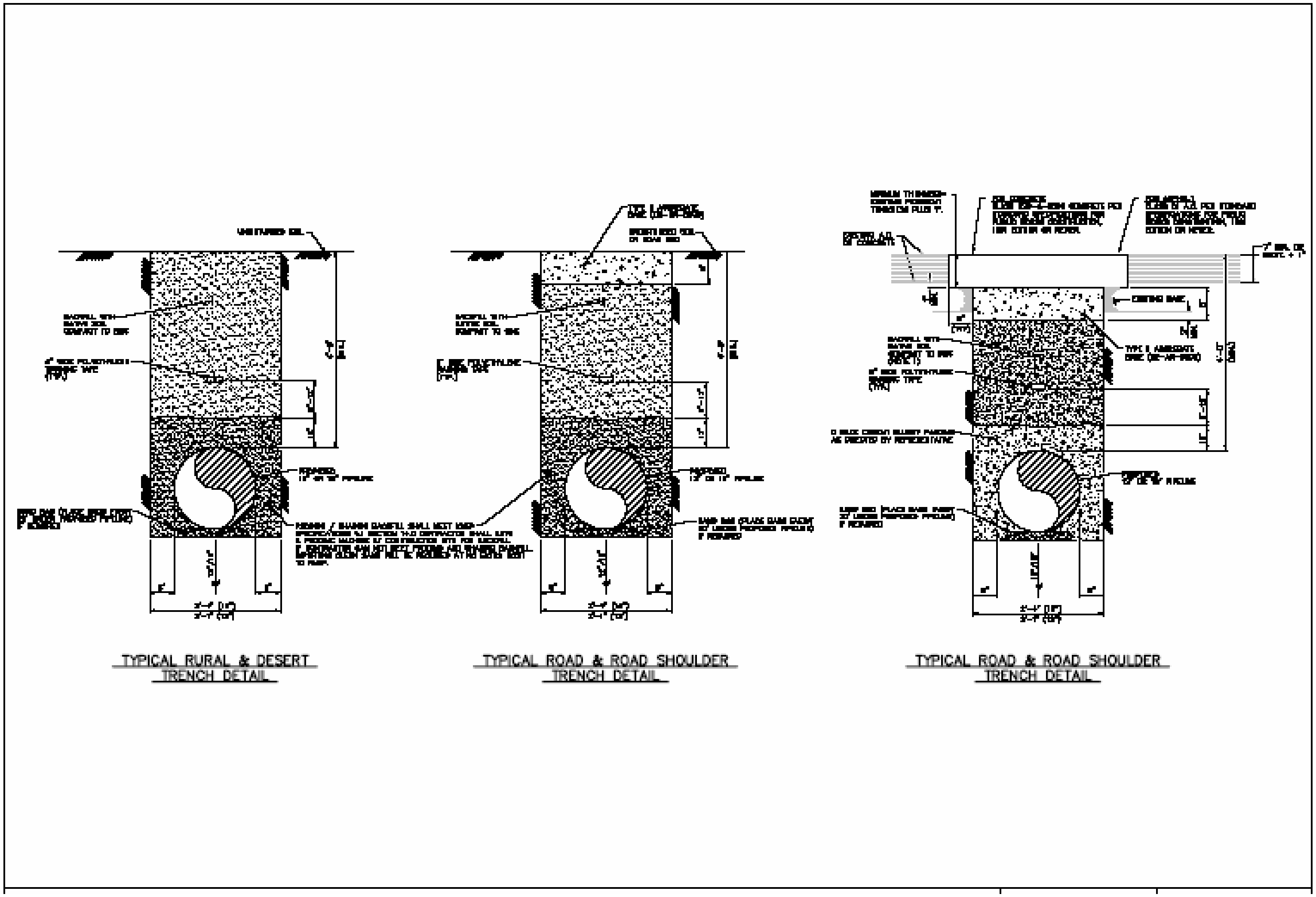


Figure 2.1-9 Trench/Backfill Profiles.

2.1.3.3 Highway Railroad and Waterway Crossing

The proposed pipeline would cross several roads, railroads, rivers, and canals. Special construction methods, such as direction drilling or boring, would be employed to make the crossing without impacting the use of the road, railroad, or waterway. Horizontal directional drilling would be used for some crossings, as well as slick boring and jacked boring methods. Horizontal directional drilling (HDD) refers to a steerable method of installing the pipe in a shallow arc underneath an obstacle. Conventional boring methods, slick and jacked, entail boring straight underneath a crossing from one end to the other. Coordination with the appropriate utility would occur prior to construction.

A conventional bore pushes pipe under the crossing obstacle from an entry bore pit to an exit bore pit. A conventional bore (cased or uncased) requires that a bore entry and exit pit be excavated to allow placement of the bore machine and tie-in of the pipe to the main pipe strings. Typically the entry bore pit is approximately 10-15 feet wide by 20-25 ft long to accommodate the bore machine and casing pipe. The exit pit is typically much smaller, 10 ft wide by 10-15 ft long since only a tie-in weld to the mainline pipe is required.

Equipment required for a conventional cased or non-cased (slick) bore would be a backhoe to excavate the pits, a bore machine consisting of a compact track mounted bore unit that pushes the casing or line pipe into the hole with hydraulic power, a small crane or boom truck to handle the casing and/or carrier pipe and a welding rig to weld the steel casing or line pipe inside the bore pit.

A drill bit is place in front of the pipe to remove the soil as the pipe is pushed by the bore unit. Typically the bit is sized only slightly larger than the pipe that will be pushed into the hole, therefore material removed is only the material displaced by the pipe itself. Excess material would be stored near the bore pit and would be used to back fill the excavated bore pits.

HDD uses a bore machine to drill under an obstacle. An initial pilot hole is drilled using special drill pipe and enlarged by subsequent passes. The carrier pipe is installed into the completed drill hole by pulling the completely assembled carrier pipe using the drill rig and drill pipe. Unlike a conventional drill, a HDD uses drilling mud to provide integrity to the completed hole and lubrication while the carrier pipe is pulled into the hole. Surface disturbance is minimal and limited only to the entry and exit hole and the working space required to layout the equipment and string the pipe. A typical drill entry/exit hole will be limited to a small area (5 ft by 5 ft). A typical work space for equipment layout is 100 ft x 150 ft. Additional space is required to layout and assemble the pipe string.

Equipment required for a HDD is the drill rig itself, mud separators, a small crane to handle drill string, boom trucks to assemble and position the carrier pipe for installation, welding trucks to assemble the pipe, vacuum trucks and pumps to control and circulate drilling fluid.

Excess material generated during the drilling process consists of the material removed from the bore hole during the pilot drill, enlarging process and installation process. The spoils are removed and circulated within the drilling mud. The spoil and drill mud are separated to allow reuse of the drilling mud and excess material would be disposed of offsite.

Table 2.1-3 identifies the apparent crossing required for each pipeline segment. The locations by milepost, crossing length, and crossing method also are listed but are subject to change.

TABLE 2.1-3
Highway, Railway, and Waterway Crossings

MP	Description	Length	Method
Segment 1–Diamond Junction to Breakout			
0.1	Loop 375	500	HDD
5.8	UPRR/Railroad Dr.	200	Jacked Bore
Segment 2–Afton to Apache Pass			
75.7	Old Hwy 10 at Cambray	250	Slick Bore
79.3	I-10 at Akela	550	Jacked Bore
100.6	Burlington Northern Santa Fe (BNSF)Railroad	220	Jacked Bore
101.6	Mimbres River	200	Open Cut
102.4	Silver City Highway	90	Slick Bore
102.8	W. Eighth St.	60	Open Cut
103.8	Peru Mill Road	60	Open Cut
103.9	Southwest Railroad	200	Jacked Bore
104.0	2nd Street (Highway 494)	200	Jacked Bore
156.5	UPRR (Mainline)	210	Jacked Bore
156.6	I-10 in Lordsburg	290	Jacked Bore
159.0	Blacktop Road	60	Open Cut
162.3	Animas Street	60	Open Cut
162.8	Main Street (Highway 494)	65	Slick Bore
173.7	Highway 338 (Animas)	210	Jacked Bore
179.0	Highway 80 (Road Forks)	60	Slick Bore

TABLE 2.1-3 (CONTINUED)
Highway, Railway, and Waterway Crossings

MP	Description	Length	Method
186.1	Cavot Road	180	Open Cut
188.3	Water Channel/Diversion Dike	80	Slick Bore
190.6	San Simon River	1000	HDD
192.3	Portal Road	60	Open Cut
195.3	Wood Canyon Road	60	Open Cut
207.0	Old Fort Bowie Road	60	Open Cut
Segment 3–Marana to Toltec			
335.9	UPRR (Mainline)	165	Jacked Bore
339.2	Missile Base Road	40	Open Cut
341.9	APS Access Road	895	HDD
345.0	Central Arizona Project Canal	500	HDD
345.3	Park Link Drive	40	Open Cut
356.3	Casa Grande Canal	460	HDD
358.1	Oak Lane	110	Open Cut
358.2	Pine Avenue	110	Open Cut
358.4	Vail Road	140	Open Cut
359.4	UPRR (Spur)	265	Jacked Bore
359.7	Casa Grande Picacho Highway (87)	210	Jacked Bore
360.6	UPRR (Mainline)	210	Jacked Bore
360.9	La Palma Road	100	Open Cut
362.1	UPRR (Mainline)	210	Jacked Bore
362.3	Sunshine Boulevard	200	Open Cut
362.6	Main Street	200	Open Cut
363.5	Eleven Mile Corner Road	200	Open Cut
363.9	Bataglia Drive	160	Open Cut
364.0	UPRR (Mainline)	210	Jacked Bore
365.0	Santa Rosa Canal	600	HDD
365.7	Houser Road	60	Open Cut
367.3	Toltec Road	40	Open Cut

TABLE 2.1-3 (CONTINUED)
Highway, Railway, and Waterway Crossings

MP	Description	Length	Method
Segment 4–Bon to Dobbins Road			
389.0	UPRR (Mainline)	260	Jacked Bore
389.1	Maricopa Casa Grande Highway	70	Slick Bore
390.7	Canal	80	Slick Bore
391.1	Murphy Road	50	Open Cut
391.7	Canal	80	Slick Bore
392.3	Hartman Road	80	Open Cut
394.7	White & Parker Road	60	Open Cut
395.9	Porter Road	60	Open Cut
396.8	Maricopa Casa Grande Highway	45	Slick Bore
396.8	UPRR (Mainline)	210	Jacked Bore
397.2	Santa Cruz Wash	700	HDD
398.4	John Wayne Parkway	110	Jacked Bore
398.7	UPRR (Mainline)	160	Jacked Bore
399.7	Highway 238	130	Jacked Bore
410.9	Santa Cruz Canal	400	Open Cut
411.6	Gila River	600	Open Cut
413.2	Beltline Road	200	Slick Bore
417.6	51st Avenue	60	Slick Bore
417.9	Judum Street	40	Open Cut
418.0	Bunn Street	40	Open Cut
419.3	Estrella Road	60	Open Cut
419.8	Carver Road	40	Open Cut
420.3	Elliot Road	85	Slick Bore
420.8	Olney Avenue	40	Open Cut
420.9	McNeil Street	40	Open Cut
421.1	Peidmont Drive	40	Open Cut
421.2	La Miranda Road	40	Open Cut
421.3	Dobbins Road	90	Slick Bore

2.1.3.4 Construction/Ancillary Facilities

Grading. A dozer would be used to grade the respective site to the appropriate elevation previously marked by a land surveyor. It is anticipated that the site would be designed to balance the cut and fill required, preventing the need for import/export of soil. Depending on the amount of grading required, compaction takes place during or after the grading operation. Compaction is achieved by using a roller or hydraulic tamper.

Foundations. Foundations are excavated using a backhoe and shovel, depending on the size. Once excavated, the foundation is framed and secured in the ground ready to be poured. When required, an assigned inspector or inspection consultant would perform testing of concrete. Cement trucks used for foundation work at the breakout facility would be washed out onsite in a designated area. Once the project is complete, concrete rubble would be removed and the washout area is restored to final specifications.

2.1.3.5 Fabrication of Piping Assemblies

Large piping assemblies are typically fabricated and assembled offsite and transported to the construction site when ready for installation. When offsite fabrication is not feasible, piping assemblies would be fabricated at the construction site. This would take place at a nearby staging area or at the actual station/terminal.

The fabrication crew consists of a pipefitter, welder, helper, boom truck operator, and at least one laborer. It is anticipated that two or three fabrication crews would be required, per station, for this project. As part of this process, all butt welds are visually and radiographically inspected. When radiographic inspection is not practical, other methods of nondestructive testing are employed.

The fabrication crew would typically be responsible for assembling the piping components. This includes the installation of valves and other equipment that are part of the piping assembly. Prior to assembly, trenches would be dug within the station to accommodate any underground pipe and electrical conduits required. Once the ditch is ready, previously fabricated portions of pipe would be lowered into the ditch and prepared for assembly with aboveground piping sections. All underground piping spools would be coated or wrapped. This process includes the testing for coating damage.

Large pieces of equipment would be delivered to the site and set once concrete has been poured and given adequate time to dry. The fabrication crew is typically responsible for ensuring the proper installation of large equipment and materials requiring supports or foundations. The pipe fabrication crew would typically utilize one crane, one forklift, one or two welding rigs, one backhoe, and two to three pickup trucks.

2.1.3.6 Typical Construction Equipment and Personnel

The following Tables 2.1-4 and 2.1-5 indicate the typical construction equipment and personnel required for the construction of the pipeline segments and stations/terminals.

TABLE 2.1-4
Typical Construction Equipment and Personnel Required for Pipeline Segments 1, 2, 3, and 4

Equipment	Activity	Personnel
	Grading	
1 Pickup		1 Foreman
1 Dozer		2 Dozer Operators
	Excavation (Normal Terrain)	
1 Pickup		1 Foreman
1 Backhoe		1 Backhoe Operator
1 Dozer w/ Ripper		1 Dozer Operators
1 Trencher		1 Operator
		4 Laborers
	Pipe Crew	
5 Welding Rigs		1 Foreman
1 Crew Cab		2 Welders
3 Sidebooms		4 Assistants
1 Tow Tractor		3 Sideboom Operators
3 Pick-ups		3 Wrappers
2 Flatbed Trucks		1 Truck Driver
1 Internal Line-up Clamp		4 Laborers
	Lowering	
1 Pickup		1 Foreman
3 Sidebooms		3 Sideboom Operators
3 Cradles		2 Welders
2 Welding Rigs		2 Assistants
1 Water Pump		1 Oiler
1 Holiday Detector		5 Laborers
	Backfilling	
1 Pickup		1 Foreman
1 Crew Cab		1 Backfill Operator
1 Dozer		1 Dozer Operator
1 Backhoe		1 Backhoe Operator
1 Backfiller/Front-end Loader		1 Oiler
		2 Laborers
	Cleanup and Restoration	
2 Pickups		1 Foreman
1 Farm Tractor		1 Dozer Operator
		1 Loader Operator
		2 Drivers
		6 Laborers
	Hydrostatic Testing	
1 Pickup		1 Foreman
1 Test Trailer/ Truck		1 Sideboom Operator
2 Air Compressors		1 Pump Operator
1 Pump		1 Hydrotest Technician
1 Fill Unit		1 Driver
1 Water Filter		4 Laborers

TABLE 2.1-5
Typical Construction Equipment and Personnel Required for Stations and Terminals

Equipment	Activity	Personnel
	Berm Construction	
1 Scraper 1 Bulldozer 11 Dump Trucks 1 Pickup 1 Vibratory Compactor 1 Track-Mounted Excavator 1 Water Truck		1 Foreman Operators Drivers
	Foundation Work	
1 Pickup 5 Portable Generators 1 Cement Truck 1 Boomed Cement Truck 1 Hydrocrane		1 Foreman Operators Drivers Laborers
	Mechanical Work	
2 Pickups 7 Welding Machines 1 Backhoe 3 Sidebooms 1 Hydrocrane 1 50-Ton Crane		1 Foreman Operators Drivers Laborers Welders Assistants
	Tank Erection	
2 20-Ton Cranes 7 100-HP Generators 2 Pickups 3 Articulating Manlifts 1 Water Pump		1 Foreman Operators Drivers Laborers
	Electrical Work	
1 Backhoe 2 Pickups		1 Foreman 1 Operator Laborers
	Finish Grading Road Construction	
1 Blade 2 Dump Trucks 2 Vibrating Compactors 1 Skip Loader 1 Paving Machine 1 Pickup		1 Foreman 1 Operator Laborer

2.2 Applicant Proposed Impact Avoidance and Minimization Measures

A biological evaluation (BE) has been prepared to address impacts to species protected under the Endangered Species Act (ESA). Measures in the BE would minimize and avoid potential impacts to endangered species. Delineation of the waters of the United States would aid in avoiding and minimizing impacts to washes. In addition, the following plans would be implemented during construction: (1) Spill Prevention and Control Plan (SPCP); (2) SWPPP for Construction Activities; (3) Noxious Weed Management and Rehabilitation (NWMRP), and (4) Mitigation Measures and Best Management Practices (Section 2.2.1).

The SPCP (Appendix B) outlines measures the applicant must implement to prevent, control, and minimize impacts from a spill of fuels or other hazardous substances during construction of the proposed project.

The goal of the SPCP is to minimize the potential for a spill through proper training of the personnel, adherence to safety and spill prevention guidelines, strict maintenance of chemical storage areas and equipment, and the housing of spill cleanup and containment materials near the construction area. In addition, the SPCP outlines actions the contractors must take in the event of a spill. These actions must include notification of both a project spill coordinator and the applicant's Construction Monitoring Team (CMT). Spilled material would be immediately and completely contained and cleaned up. The material manufacturer's methods for spill cleanup would be followed as described on the material safety data sheets (MSDS). If the spill is beyond the response capabilities of the contractor, immediate notification of the CMT is required so that an emergency response contractor may be retained. The contractors are required to complete a Spill Report Form for all spills of hazardous substances, regardless of size or location. Mitigation of spills would constitute a ground disturbing activity and would require an archaeological monitor if the spill occurs outside the 100-foot-wide temporary work space corridor. If a spill occurs within or outside the ROW corridor, the Project Compliance Inspector and landowner would be immediately notified. The contractors also are required to notify the CMT of any hazardous conditions that may arise as outlined in the SPCP.

The SWPPP (Appendix C) is designed to manage the quality of stormwater runoff from construction activities associated with the project. The SWPPP is required by the NPDES program, which was established under Section 402 of the CWA to control discharge of pollutants from construction activities impacting greater than 5 acres. Guidelines outlined in the Best Management Practices (BMPs) of the SWPPP consist of implementation and timing of appropriate control measures that would be used during construction to control pollutants in stormwater discharges. Construction supervisors would coordinate all activities to ensure that local controls are in place prior to construction in an active area, and that such areas are stabilized when construction is complete. Sediment traps (silt fences and/or straw bales) would be installed as needed by the contractors, after the clearing and grubbing necessary to install the control but before trench excavation begins in the active portion of the site. Steeper upslope areas have the potential for introducing sediment into stormwater runoff and would be stabilized by tacking straw into the disturbed soil. All straw to be used must be certified as weed free, as detailed in the NWMRP (Appendix D).

The NWMRP contains specific measures that have been proposed to avoid the spread or infestation of noxious weeds as a result of the proposed project. A noxious weed is defined as a plant species that has been introduced to an area following European settlement and has been determined to have negative economic and environmental effects. Noxious weeds are often very successful colonizers of disturbed areas and can completely dominate an area indefinitely. Species deemed as "noxious" are most often inedible to livestock and wildlife and therefore have the overall effect of reducing available forage and habitat.

Federal, state, and local agencies have enacted various legislation to quell the spread of noxious weeds. The applicant is committed to adhering to applicable regulations to prevent the spread of plant pests during construction activities.

2.2.1 Mitigation Measures and Best Management Practices

Mitigation measures and BMPs are included as an integral part of the Proposed Action to minimize resource impacts. Therefore, to minimize potential resource impacts, the mitigation measures outlined in Table 2.2-1 would be implemented for the Proposed Action. The environmental effects described in Section 3 are predicted with the assumption that these measures would be applied. Appropriate mitigation measures and BMPs would occur previous to, or simultaneously with, approved ground disturbing activities.

TABLE 2.2-1
Mitigation Measures Required for Proposed Action

	Mitigation	Reason
	Soil and Water	
SW1	Clean out existing culverts, if necessary, on roads within project area before operations in the spring and at the end of operations in the fall.	To minimize impacts on soils and water resources
SW2	Install and maintain drainage structures in roads to reduce concentration of water runoff. Road drainages shall direct flow into stable areas of vegetation and cover.	To reduce concentration of water runoff, thus minimizing soil detachment and sediment transport
SW3	Install new culvert outfalls with either riprap or another form of energy dissipater, if applicable.	To break up concentrations of water and sediment flow, and prevent road undercutting
SW4	If needed, gravel and/or install erosion structures on roads, where activities cross a drainage.	To minimize sediment delivery into drainage
SW5	Schedule operations, construction, and ditch/road maintenance activities during periods when probabilities for rain and runoff are low. Equipment shall not be operated when ground conditions are such that unacceptable soil compaction or displacement results.	To minimize soil compaction, soil detachment, and sediment transport; to maintain long-term soil productivity
SW6	Dispose of excess material from boring methods offsite.	To minimize impacts on soils and water resources.
SW7	Maintain roads in a manner that provides for water quality protection.	To minimize rutting, failures, side casting, and blockage of drainage facilities, which could cause sedimentation and erosion

TABLE 2.2-1 (CONTINUED)
Mitigation Measures Required for Proposed Action

	Mitigation	Reason
	Vegetation	
V1	Identify and flag staging area boundaries for heavy equipment.	To protect existing vegetation surrounding the project site from damage during construction
	Noxious Weeds	
N1	Clean off-road equipment (with power or high-pressure cleaning) before moving into construction area.	To remove seed source that could be picked up by passing vehicles and limit seed transport into project area
N2	Gravel and fill to be placed in relatively weed-free areas, which are at moderate or high ecological risk to weed invasion, must come from weed-free sources.	To minimize weed spread caused by moving infested gravel and fill material to relatively weed-free locations
N3	Keep active road construction sites that are in relatively weed-free areas and are at moderate or high ecological risk to weed invasion closed to vehicles that are not involved with construction.	To minimize sources of weed seed
N4	New road maintenance programs should include monitoring for noxious weeds along newly constructed maintenance roads. Weed infestations should be inventoried and scheduled for treatment during construction.	To minimize roadside sources of weed seed that could be transported to other areas
	Wildlife	
W1	Perform construction activities outside the breeding season of the cactus ferruginous pygmy owl (CFPO) within potential breeding habitat in Segment 3 (MP 350 to 353). CFPOs generally nest from April to June.	To avoid disturbance to CFPOs potentially breeding in the area (Extremely low possibility of individuals being present.)
W2	To the extent practicable, avoid large mesquites and saguaros within potential breeding or dispersal habitat along Segment 3 (MP 335.89 to 342). Plants to be avoided would be flagged prior to construction.	To minimize disturbance of potential CFPO breeding or dispersal habitat
W3	To the extent practicable, avoid yuccas over 2.5 meter in height within potentially suitable habitat between MP 101 and 150 along Segment 2. Plants to be avoided would be flagged prior to construction.	To minimize disturbance of potential northern aplomado falcon habitat
W4	In roadways or in areas where pedestrian or vehicle traffic is present, provisions would be made to cover any open trenches.	To minimize threats to wildlife as well as the public
	Air	
A1	Adhere to state regulatory standards.	To minimize effects within each airshed
A2	Include a provision in the construction contract to water down access roads and construction areas as needed.	To address the potential problem of fugitive dust during times of no moisture

TABLE 2.2-1 (CONTINUED)
Mitigation Measures Required for Proposed Action

	Mitigation	Reason
	Human Environment	
H1	Conduct heritage surveys in consultation with the State Historic Preservation Office (SHPO) and locate areas to be avoided.	To protect and preserve heritage resources in the project area
H2	If heritage resource sites are discovered during construction and clearing, stop operations in the area immediately and contact appropriate agency.	To protect and preserve heritage resources in the project area
H3	In roadways or in areas where pedestrian or vehicle traffic is present, provisions would be made to cover any open trenches.	To minimize the threat to public safety.
H4	Heavy equipment would be secured along the ROW consistent with jurisdictional requirements.	To minimize the threat to public safety.
H5	During construction, post traffic caution signs at critical locations.	To alert the traveling public and protect them from heavy equipment in construction areas

2.3 Alternatives Considered but Eliminated from Further Analysis

The Proposed Action has been modified and routed to best fit the existing ROW and to minimize impacts to existing resources. The proposed ROW is, to the extent possible, parallel to and adjacent to the existing pipeline that is being replaced. Locating the new pipeline as near as possible to the existing pipeline provides the opportunity to take advantage of areas disturbed by previous construction and, in some locales, to take advantage of existing easements. Making use of previously disturbed areas and existing easements allows the impact to the environment to be as minimal as possible and also allows for cost reductions.

2.3.1 New Route That Does Not Follow the Existing ROW

Early in the process of considering the feasibility of the East Line Expansion Project, consideration was given to constructing the pipeline along a new route that did not specifically closely follow the existing route. It was determined that such a route would not only be more costly but also would cause considerably more impact to the environment than what has become the Proposed Action, and would likely cause heightened environmental concerns from the public.

2.3.2 Trucking

Additional trucking is a consequence of no action. However, planned additional trucking also can be an alternative to gaining additional capacity through pipeline expansion.

Planned additional trucking was considered early in the feasibility process but was not considered for further analysis because of public safety concerns with more trucks on the highways increasing the possibility of accidents, impact to the roadways caused by additional trucks, impacts to the environment cause by additional emissions from the trucks, and the awareness that additional trucking would be a short-term solution and not obviate the need for a new pipeline as the population continues to increase in the Tucson/Phoenix area. Trucking would not achieve the purpose and need of providing a safer and more reliable mode of transporting petroleum products.

2.3.3 Other Considerations

Other considerations, while not constituting individual specific alternatives, were considered during the course of determining the Proposed Action and eliminated from further analysis. These considerations are listed in Table 2.3-1 along with the justification for not including them in the Proposed Action.

TABLE 2.3-1
Other Considerations Eliminated from Further Analysis.

Segment	MP	Alternative Routes Considered but Eliminated From Further Analysis	Proposed Action Route	Justification
1	6.2	Locate breakout terminal closer to Ashley Road	Relocation of new breakout terminal and pipeline endpoint	Avoid impacts to archeological site Maximize distance from Bruce Foods facility
2	80.5–94.5	Continue to follow alongside I-10	Move route to north side of railroad	Minimize railroad crossings
2	103–103.6	Continue route through residential area	Relocate route along existing dirt road, around residential area	Avoid impacts to adjacent residences
2	107.6–156.5	Locate route south of railroad between I-10 and railroad	Relocate route to north side of railroad	Minimize railroad crossings
2	207.43–210	Continue route to MP 210	Reduced route length to terminate at MP 207.43	Avoid encroachment on Fort Bowie National Monument
3	357–360	Continue to follow railroad	Relocate route to north side of Picacho School Road	Avoid industrial buildings and minimize railroad crossings
3	361.7–363	Locate route alongside Hwy 93	Adjust route to follow railroad ROW	Avoid city street encroachments
4	389–391	Continue route straight along railroad	Adjust route to the north	Avoid encroachment on Ak-Chin Indian Reservation

2.4 No Action Alternative

As required by NEPA, a No Action Alternative has been included in this EA for review alongside the Proposed Action (40 CFR §1502.14(d). The No Action Alternative provides a baseline to compare against the effects of the Proposed Action.

Under the No Action Alternative, replacement of approximately 233 miles of pipeline between El Paso and Phoenix would not occur nor would the installation of any associated ancillary facilities occur. No station or terminal upgrades would take place at the El Paso, Deming, Tucson, or Phoenix Stations, including a new breakout facility on Segment 1. SFPP's East Line would continue to operate in its current state, which would not meet the purpose and needs outlined in Section 1.2.

The Phoenix/Tucson region is predicted to experience continued unprecedented growth, which would place added pressure on municipalities to provide adequate petroleum product supplies. With the selection of the No Action Alternative, the current supply of petroleum products would have to satisfy the increasing demands of this growing population. Under the No Action alternative, the use of tanker truckers would continue (and ultimately increase) to provide adequate petroleum supplies to a rapidly increasing population. Potential environmental impacts associated with hauling petroleum products by tanker trucks would increase as a result. These impacts include air pollution, possible spillage, and other traffic accidents during hauling, noise pollution due to truck traffic, and wear on highways and roads caused by repetitive truck passage.

SECTION 3.

Affected Environment and Environmental Consequences

SECTION 3

Affected Environment and Environmental Consequences

This section describes critical environmental elements that may be affected by the Proposed Action and the environmental consequences. Each critical environmental element provides the impact conclusions of the primary issues such as public safety, water resources, and threatened and endangered species.

The following critical elements of the environment were considered but are not addressed since they are not present or not affected in any way: Areas of Critical Environmental Concern, Prime or Unique Farmlands, Native American Religion Concerns, Wild and Scenic Rivers, and Wilderness.

3.1 General Setting

The proposed project spans portions of three states, nine counties, and two North American deserts. Elevations across the project range from 4,000 feet to approximately 1,000 feet above sea level. Extreme temperature changes are common throughout these desert regions. Average annual temperatures range from 63.2°F in the El Paso region to 72.6°F in the Phoenix region.

3.1.1 Segment 1

The majority of Segment 1 is located within the Fort Bliss Military Reservation east of the Franklin Mountains in northeast El Paso. A breakout facility including less than half a mile of new pipeline is the portion of this segment located outside the Fort Bliss boundary. Segment 1 does not parallel a roadway but bisects two roadways. The proposed ROW is dominated by mesquite desert on sandy soils. The vegetation is common to the Chihuahuan desert region.

3.1.2 Segment 2

Segment 2 is the longest segment, originating south of Las Cruces, New Mexico and ending in eastern Cochise County, Arizona. The majority of this segment is closely associated with I-10 and the UPRR except for portions on the east and west ends. Segment 2 traverses variations of plant communities common to the Chihuahuan desert.

3.1.3 Segment 3

Segment 3 follows closely alongside the UPRR and I-10 between Tucson and Casa Grande, Arizona. The proposed ROW passes north of Picacho Peak State Park. This approximately 30-mile segment contains both Sonoran desert plant communities and agricultural land.

3.1.4 Segment 4

Segment 4 continues to follow the railroad northwest to Maricopa, Arizona, then passing through the GRIC land to Laveen, Arizona. This segment runs through the Gila River Valley between the Sierra Estrella Mountains and the South Mountains just south of Phoenix. The GRIC portion of the segment contains saltbush scrub and 1-mile-long tamarisk crossing of the Gila River.

3.1.5 Ancillary Facilities

As described in Section 2.1.2, ancillary facilities to be constructed or modified include a new breakout facility in El Paso County (Segment 1), four existing pump stations, two existing terminals, new and existing valves as needed, cathodic protection test stations, and pipeline markers. Two scraper stations also would be installed along Segment 2 of the proposed project. The general settings of the ancillary facilities are similar to the descriptions provided above, mainly predisturbed vacant Chihuahuan or Sonoran Desert environment.

3.2 Land Use

The SFPP pipeline crosses both federal and non-federal jurisdictions. Since the route of the four proposed segments are dictated largely by the location of the existing pipeline, most of the lands crossed are within predisturbed railroad, pipeline, and fiber-optics ROWs. When the pipeline crosses small cities along the way, such as Deming, New Mexico, and Eloy, Arizona, there are more commercial, industrial, and residential developments. Grazing areas also are found along the segments; however, none are predicted to be disturbed at the moment. If fences, gates, and/or water tanks disturbances occur on grazing land, the owner will be notified and any disturbance will be mitigated by returning the adjustments to their original condition and location as possible.

Figure 3.2-1 presents the surface land ownership for the four proposed segments, and Table 3.2-1 presents land ownership disturbance by segment.

3.2.1 Affected Environment

3.2.1.1 Segment 1

Segment 1 is 6.2 miles in length and 75 acres in area, including the temporary 100-foot construction easement. All of Segment 1 is located in El Paso County. Land ownership includes Fort Bliss, El Paso Natural Gas, Southern Pacific Pipeline, Bruce Foods Corporation, El Paso County, and the City of El Paso Public Service Board properties.

3.2.1.2 Segment 2

Segment 2 is 161 miles in length and 1,951.52 acres in area, including the temporary 100-foot construction easement. Segment 2 is located in Dona Ana, Luna, Grant, Hidalgo, and Cochise Counties. Land ownership is mainly vacant desert BLM lands and New Mexico state lands. The private lands are mostly used for grazing or were previously used for grazing.

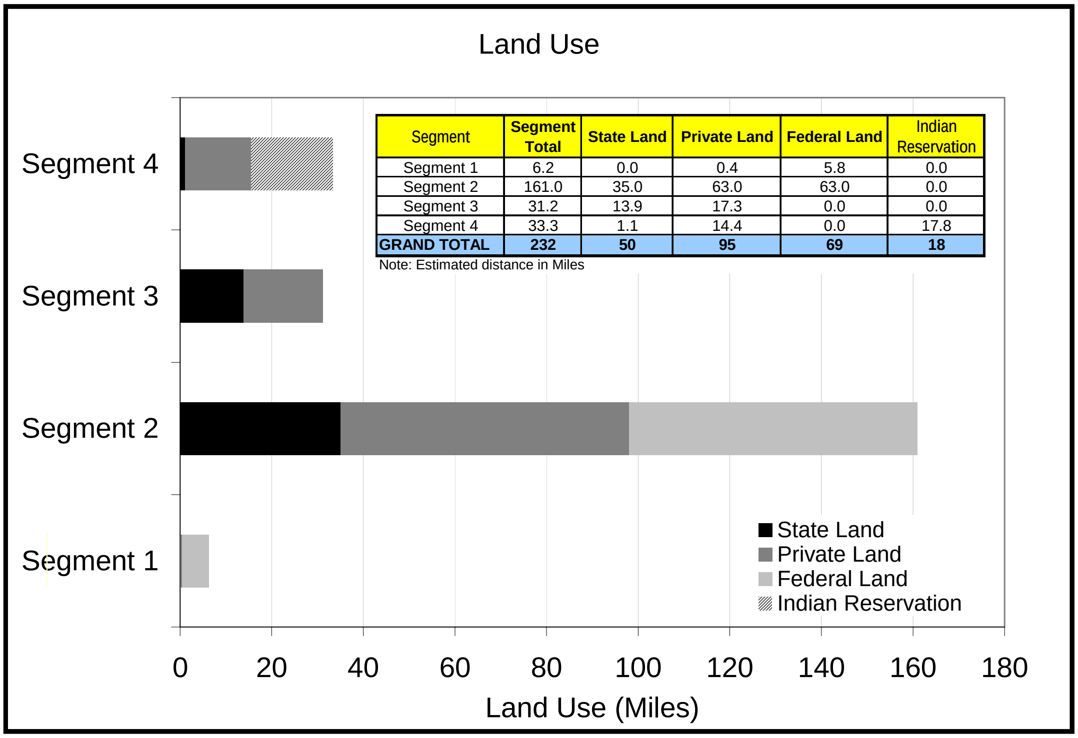


FIGURE 3.2-1
Land Use Ownership by Segment (Federal land in Segment 1 is all Ft. Bliss while Federal land in Segment 2 belongs to BLM)

TABLE 3.2-1
Land Use Disturbance by Segment

		1	2	3	4	Total By Land Use
State Land	**Miles**	0.0	35.0	13.9	1.1	**50.0**
	Acres	0.0	424.2	168.5	13.3	**606.0**
Private Land	**Miles**	0.4	63.0	17.3	14.4	**95.1**
	Acres	4.8	763.6	209.7	174.5	**1,152.6**
Federal Land	**Miles**	5.8	63.0	0.0	0.0	**68.8**
	Acres	70.3	763.6	0.0	0.0	**833.9**
Indian Reservation	**Miles**	0.0	0.0	0.0	17.8	**17.8**
	Acres	0.0	0.0	0.0	215.7	**215.7**
Total By Segment (Miles)		**6.2**	**161.0**	**31.2**	**33.3**	
Total By Segment (Acres)		**75.1**	**1,951.3**	**378.1**	**403.6**	

Note: Segment 1- additional 35 acres disturbance for breakout facility. Scraper stations are included within the ROW boundary.

3.2.1.3 Segment 3

Segment 3 is 31.2 miles in length and 378.1 acres in area, including the temporary 100-foot construction easement. Segment 3 is located in Pima and Pinal Counties. Land ownership is mainly vacant desert Arizona state lands and private lands. The private lands are used for grazing or were previously used for grazing and agriculture.

3.2.1.4 Segment 4

Segment 4 is 33.3 miles in length and 403.6 acres in area, including the temporary 100-foot construction easement. Segment 4 is located in Pinal and Maricopa Counties. Land ownership is mainly vacant desert GRIC land, private lands, and some state lands. Segment 4 extends north into the City of Phoenix public ROW. Most private lands are properties obtained for current and future residential land development. Some private lands are used for existing agriculture and grazing.

3.2.1.5 Ancillary Facilities

The breakout facility would be located in El Paso on vacant Public Service Board (PSB) property. Appropriate zoning has been approved through the Land Planning Commission in the City of El Paso. Purchase of the land is from the city through the PSB.

3.2.2 Environmental Consequences

3.2.2.1 Proposed Action

Landowners would be notified in advance of any construction or survey activities that might interfere with their operations and privacy. For the most part, this project is located within an existing utility corridor on both public and private land; therefore, no significant impacts are expected in the long term. Temporary short-term impacts during construction may include inconveniencing private landowners during surveys and construction activities to gain access to their lands. Provisions will be made to accommodate concerns expressed by any of the consulted Native American Indian tribes.

3.2.2.2 No Action Alternative

Under the No Action Alternative, no pipeline expansion would occur and land use regulations along each segment would remain unchanged. Land use would not be affected by implementation of the No Action Alternative. No mitigation would be required.

3.3 Recreational Resources

3.3.1 Affected Environment

Recreational activities include hunting, camping, picnicking, nature studying and observation, wildlife and cultural viewing, hiking, photography, back-country vehicle use, off-roading, and sightseeing, among others.

Impacts on recreational resources would occur if the construction, operation, and/or the existence of the pipeline resulted in the degradation or termination of the recreational activities in any specific area.

3.3.1.1 Segment 1

No specific recreational resources were found in Segment 1. General recreational resources in the area include nature, wildlife, and cultural observation. No hunting is allowed within city limits. Photography and off-roading are not typical in that area of El Paso or on Fort Bliss.

3.3.1.2 Segment 2

No specific recreational resources were found in Segment 2. General recreational resources in the area include nature, wildlife, and cultural observation; hunting; photography; and off-roading.

3.3.1.3 Segment 3

No specific recreational resources were found in Segment 3. General recreational resources in the area include nature, wildlife, and cultural observation; hunting; photography; and off-roading.

3.3.1.4 Segment 4

Other than the GRIC, no specific recreational resources were found in Segment 4. General recreational resources in the area include nature, wildlife, and cultural observation, especially on the GRIC; hunting; photography; and off-roading.

3.3.1.5 Ancillary Facilities

No specific recreational resources were found where ancillary facilities exist or are proposed. Most of these locations are currently occupied with pipeline or other energy source facilities.

3.3.2 Environmental Consequences

3.3.2.1 Proposed Action

No potential impact would occur on recreational resources. Construction activity would present minimal and temporary impacts in terms of temporary delays in traffic.

3.3.2.2 No Action Alternative

Under the No Action Alternative, no pipeline expansion would occur and recreational resources along each segment would remain unchanged. However, the shortage of petroleum products in the Tucson/Phoenix markets may increase fuel prices due to high demand. This might discourage lower income populations from taking recreational trips requiring car travel into recreational areas. No mitigation would be required.

3.4 Geology and Soils

3.4.1 Affected Environment

3.4.1.1 Segment 1

The topography along Segment 1 is relatively flat with occasional gentle slopes. Segment 1 follows an existing pipeline alignment, and the topography does not pose any unusual hazard.

Geologically, Segment 1 traverses unconsolidated alluvial deposits of the Rio Grande system. Alluvial deposits are typically easy to excavate and do not pose a significant hazard to pipeline installations.

Segment 1 is within an area of moderately low seismic activity. Standard earthquake protection measures would be appropriate for Segment 1.

Soil types in this region are thermic semiarid, with mean annual soil temperatures of 15 to 22°C. Most soils are deep, moderately coarse and coarse textured, derived from acidic igneous rocks.

One potential constraint on installation of the pipeline is the presence of caliche in the El Paso area. Caliche is a discontinuous calcareous deposit that varies in thickness and hardness. Some caliche-lithified areas consist only of friable carbonate cement in soil at the depth of a historical water table. Other caliche-lithified areas can be several feet of well-indurated deposits that are harder than concrete. There are no apparent obstacles with respect to topography, geology, seismicity, or soil type in Segment 1.

3.4.1.2 Segment 2

The proposed and alternative routes for Segment 2 pass through the same or similar terrain and geology. The topography along the segment is relatively flat with occasional gentle slopes. Greater topographic relief is encountered near the Pyramid Mountains and through Steins Pass area of the Peloncillo Mountains near the New Mexico/Arizona border. Segment 2 follows an existing pipeline alignment, and the topography does not pose any unusual hazard. Both the Pyramid and Peloncillo Mountains are located in the western half of Segment 2.

Geologically, Segment 2 generally passes through unconsolidated alluvial or playa deposits. Alluvial and playa deposits are typically easy to excavate and do not pose a significant hazard to pipeline installations. Volcanic areas exist near the Pyramid Mountains and Cedar Mountain.

Segment 2 is within an area of low seismic activity. The entire area has a 10 percent chance of experiencing an earthquake with an acceleration of 3 to 6 percent within the next 50 years. Standard earthquake protection measures would be appropriate for Segment 2.

Soil types in this region are thermic semiarid, with mean annual soil temperatures of 15 to 22°C. Most soils are deep, fine grained to moderately coarse, derived from acidic igneous rocks. Exceptions include soils derived from localized basalt flows and from saline-sodic soils located in the playa regions.

One potential constraint on installation of the pipeline is the presence of caliche across southern New Mexico and Arizona. Some caliche-lithified areas consist only of friable carbonate cement in soil at the depth of a historical water table. Other caliche-lithified areas can be several feet of well-indurated deposits that are harder than concrete.

Additional constraints along Segment 2 may include lateral spreading hazards. Possible lateral spreading hazards occur at locations where the alignment extends across or near the margins of a channel, river, or other body of water with the potential for erosion and/or sloughing of saturated sediments along an embankment. Appropriate design approaches can mitigate the lateral spread hazard. There are no apparent obstacles with respect to topography, geology, seismicity, or soil type in Segment 2.

3.4.1.3 Segment 3

Segment 3 traverses relatively flat topography, and very little relief is encountered. Geologically, Segment 3 passes through unconsolidated alluvial deposits that are easily excavated.

Segment 3 appears to be within a low to moderately low seismically active area. The entire area has a 10 percent chance of experiencing an earthquake with an acceleration of 4 to 8 percent within the next 50 years. Standard earthquake protection measures would be appropriate for Segment 3.

Soil types in this region are hyperthermic arid, with mean annual soil temperatures exceeding 22°C. Most soils are deep, moderately fine grained, derived from acidic igneous rocks. The exception comes in the case of soils derived from localized basalt flows. Soils along this corridor have a shrink/swell potential that could affect the pipeline. Soils with this potential generally swell as they become saturated and shrink as they release water. This alternating sequence of shrinking and swelling can result in locally unstable soils.

Similar to Segments 1 and 2, one possible geologic/lithologic constraint in Segment 3 is the presence of caliche.

Lateral spreading and subsidence with resultant earth fissures present possible hazards in Segment 3. Slow, large-scale subsidence due to the overpumping of regional groundwater is occurring in several portions of both Arizona and New Mexico. In a portion of Pinal County between Phoenix and Tucson, an area of more than 100 square miles sank at least 7 feet between 1952 and 1977. This area includes the town of Eloy, Highway 10, Highway 87, and 11 miles of the Southern Pacific Railroad alignment.

There are no apparent obstacles with respect to topography, geology, seismicity, or soil type identified in Segment 3. However, subsidence and soil contraction and expansion may present engineering challenges.

3.4.1.4 Segment 4

Both the proposed and alternative alignments for Segment 4 traverse relatively flat topography, and very little relief is encountered. Geologically, Segment 4 passes through unconsolidated alluvial deposits that are easily excavated.

Although Segment 4 does not cross identified faults, seismicity screening was performed. Segment 4 appears to be within a low to moderately low seismically active area that is relatively stable. All of Segment 4 has a 10 percent chance of experiencing an earthquake with an acceleration of 4 to 8 percent within the next 50 years. Standard earthquake protection measures would be appropriate for Segment 4.

Soil types in this region are hyperthermic arid, with mean annual soil temperatures exceeding 22°C. Most soils are deep, moderately fine grained, derived from acidic igneous rocks. The exception comes in the case of soils derived from localized basalt flows. Soils along this corridor have a shrink/swell potential that could affect the pipeline. Soils with this potential generally swell as they become saturated and shrink as they release water. This alternating sequence of shrinking and swelling can result in locally unstable soils.

As with the previously discussed segments and for the same reasons, lateral spreading and the occurrence of large-scale subsidence present possible hazards in Segment 4.

Similar to Segment 3, there are no apparent obstacles with respect to topography, geology, seismicity, or soil type in Segment 4.

3.4.1.5 Ancillary Facilities

The 35-acre site for the proposed breakout facility on Segment 1 contains topography, geology, and soil types consistent with the remainder of the segment. Pump stations, terminals, valves, scraper stations, cathodic protection test stations, and pipeline markers also have geology and soil types consistent with the segments in which they are located.

3.4.2 Environmental Consequences

3.4.2.1 Proposed Action

Implementation of the Proposed Action would result in short-term impacts to geology and soil as result of construction activities. After pipe installation is complete, the ROW would be recontoured to the original topography with the original soil that was excavated. Caliche or large rock material would be spread across the ROW or disposed of according to appropriate guidelines and landowner approval. No significant long-term impacts are expected. Erosion measures would be in place to help maintain ROW topography. Additionally, the proposed project area would follow alongside existing linear ROWs that have been disturbed in the past and may undergo continual disturbance.

3.4.2.2 No Action Alternative

Under the No Action Alternative, no pipeline expansion would occur and no ground-disturbing activities would take place. Geology and soils within the proposed project area would remain unchanged, and therefore, would not be affected. No mitigation would be required.

3.5 Hydrology and Water Quality

3.5.1 Affected Environment

3.5.1.1 Segment 1

Groundwater in Segment 1 is located in the Hueco Bolson aquifer. The alluvial deposits are composed of gravel, sand, silt, and clay. Groundwater is typically at a depth greater than 100 feet belowground surface (bgs). There do not appear to be any hydrogeologic features that preclude constructing a pipeline along this segment of the alignment.

Potentially high in total dissolved solids (TDS), the water type varies by location from sodium bicarbonate to calcium-sodium sulfate. While waters may be corrosive in some areas, overall water quality, coupled with the probable depth of groundwater, does not pose a problem for the construction and maintenance of the pipeline.

3.5.1.2 Segment 2

Groundwater in Segment 2 begins within the alluvium of the Rio Grande system but moves into the Basin and Range system at the New Mexico-Arizona border. The alluvial deposits are composed of gravel, sand, silt, and clay. Groundwater is typically at a depth greater than 100 feet bgs, but may approach the ground surface in some areas in larger towns and cities and near river crossings. Local dewatering of an excavation may be necessary in these areas. There do not appear to be any hydrogeologic features that preclude constructing a pipeline along this segment of the alignment.

The water quality of the shallow aquifer improves as the segment goes from the Rio Grande system to the Basin and Range system. TDS drops as the Basin and Range alluvium is more regularly flushed with recharge than the Rio Grande alluvium. Water types are commonly calcium-magnesium sulfate-bicarbonate with the exception of the local surficial groundwater systems related to the playa lakebeds (sodium chloride water types). While waters may be corrosive in some areas, overall water quality, coupled with the probable depth of groundwater, does not pose a problem for the construction and maintenance of the pipeline.

3.5.1.3 Segment 3

Groundwater in Segment 3 is located entirely within the Basin and Range system. The alluvial deposits are composed of gravel, sand, silt, and clay. Groundwater is typically at a depth greater than 100 feet bgs, but may be near the ground surface in some areas such as larger wash crossings and near towns such as Eloy. Local dewatering of an excavation may be necessary in these areas. There do not appear to be any hydrogeologic features that preclude constructing a pipeline along this segment of the alignment.

The water quality of the shallow aquifer is generally suitable for most uses. TDS is normally less than 1,000 parts per million (ppm) as the alluvium is regularly flushed with recharge. Water types are commonly calcium-magnesium sulfate-bicarbonate with the exception of the local surficial groundwater systems related to the playa lakebeds (sodium chloride water types). While waters may be corrosive in some areas, overall water quality, coupled with the probable depth of groundwater, does not pose a problem for the construction and maintenance of the pipeline.

3.5.1.4 Segment 4

Groundwater in Segment 4 is located entirely within the Basin and Range system. The alluvial deposits are composed of gravel, sand, silt, and clay. Groundwater is typically at a depth greater than 100 feet bgs, but may approach the ground surface in some areas in larger towns and cities and near river crossings. Local dewatering of an excavation may be necessary in these areas. There do not appear to be any hydrogeologic features that preclude constructing a pipeline along this segment of the alignment.

The water quality of the shallow aquifer is generally suitable for most uses. TDS is normally less than 1,000 ppm as the alluvium is regularly flushed with recharge. Water types are commonly calcium-magnesium sulfate-bicarbonate with the exception of the local surficial groundwater systems related to the playa lakebeds (sodium chloride water types). While waters may be corrosive in some areas, overall water quality, coupled with the probable depth of groundwater, does not pose a problem for the construction and maintenance of the pipeline.

3.5.1.5 Ancillary Facilities

Groundwater at the 35-acre site for the proposed breakout facility on Segment 1 is contained within the Hueco Bolson aquifer. The pump stations, terminals, valves, scraper stations, cathodic protection test stations, and pipeline markers contain groundwater in the system consistent with the segments in which they are located. Groundwater at each of the segments is typically 100 feet bgs with the slight possibility of being near the ground surface in isolated instances.

3.5.2 Environmental Consequences

3.5.2.1 Proposed Action

Implementation of the Proposed Action may result in the short-term impact of local hydrology or water quality in the event that groundwater is encountered during excavation and dewatering is necessary. However, this potential impact would only occur during pipe installation and would be temporary. No long-term impacts to hydrology or water quality are expected. Additionally, the proposed project area would follow alongside existing linear ROWs that have experienced past pipeline installations with no long-term impacts to hydrology or water quality.

3.5.2.2 No Action Alternative

Under the No Action Alternative, no pipeline expansion would occur and no excavation of the ROW would take place. Hydrology and water quality within the proposed project area would remain unchanged, and therefore, would not be affected. No mitigation would be required.

3.6 Floodplains and Wetlands

3.6.1 Affected Environment

3.6.1.1 Segment 1

Segment 1 is comprised entirely of mesquite desert. The landscape is dominated by sand dunes with mesquite (*Prosopis* spp.) hummocks. Salt bush (*Atriplex canescens*), snakeweed (*Gutierrezia sarothrae*), and yuccas (*Yucca* spp.) are scattered throughout the area as well.

3.6.1.2 Segment 2

Mesquite desert is the dominant habitat in Segment 2 and comprises approximately 65.4 miles of this segment. Semi-desert grassland is the second-most dominant habitat type, making up approximately 45.3 miles of Segment 2. Other habitats include creosote scrub (approximately 28.3 miles), yucca grassland (approximately 13.6 miles), desert scrub (approximately 7.8 miles), salt playa (approximately 5.8 miles), agricultural land (approximately 1.6 miles), and bare land (approximately 1 mile). In addition, there is a small riparian crossing approximately 0.1 mile in length.

Segment 2 of the pipeline replacement project begins in the El Paso-Las Cruces Hydrologic Unit approximately 1.4 miles east of the Rio Grande and approximately 0.5 miles east the West Side Canal. Between MPs 38.8 and 42, a total of 14 well-defined open sandy channels are present within the study area. These drainages ranged from approximately 6 feet wide to approximately 50 feet wide. These features were all associated with the gentle topographic rise (average 2 percent slopes) on the western side of the Mesilla Valley. The only other feature observed in this hydrologic unit was a narrow, approximately 3 feet wide, well-defined open sandy drainage channel near MP 59.

Near MP 60, the alignment crosses into the Mimbres Hydrologic Unit. The upper reach of the Mimbres River is perennial but as the river enters Luna County the river becomes intermittent with infrequent flows and the well-defined river channel terminates approximately 10 miles east of Deming. The pipeline replacement would cross the Mimbres River between MPs 101 and 102, approximately 3 miles east of Deming where the open sandy channel is approximately 27 feet wide. In addition to the Mimbres River, 12 other well-defined, open, sandy ephemeral washes were observed within the study area within this basin. These channels ranged from small 2 to 6 feet wide, often braided systems, to larger 10 to 15 feet wide, open sandy channels.

At the Continental Divide (near MP 129), the pipeline alignment enters the Animas Valley Hydrologic Unit. Parts of this basin are characterized by a prominent pattern of shallow, ephemeral tributary channels, extensive playa lakes, and areas where sheet flooding occurs during periods of heavy precipitation. Sixty well-defined drainage features were observed within the study area within this basin. Significant features in this area included the Shakespeare Arroyo, which is a large open sandy channel approximately 30 feet wide near MP 163. Several well-defined drainages including Steins Creek also are present within the study area between MPs 183 and 188. This section of the alignment also crosses South Alklai Flat playa between MPs 172 and 178.

Near MP 190, the alignment enters the San Simon Hydrologic Unit. Fifty-two well-defined drainage channels were observed in the study area within this basin. The alignment would cross the San Simon River near MP 190.5. The river channel in this area in approximately 8 feet wide and supports a narrow band of riparian vegetation. Flows in this reach appear to be perennial as a result of agricultural irrigation runoff. Between MP 193 and the termination of Segment 2, 49 well-defined ephemeral drainages ranging from 4 feet to 50 feet wide were observed within the study area.

3.6.1.3 Segment 3

Segment 3 is primarily comprised of agricultural land; desert, mesquite and creosote scrub occur within the remaining portions of Segment 3. Agricultural land makes up approximately 12.45 miles of Segment 3. Desert scrub comprises approximately 7.4 miles of this segment. Mesquite desert and dense mesquite/wash habitat occur within 5 miles and 2.7 miles of this segment, respectively. Segment 3 also includes approximately 3.3 miles of creosote scrub.

Segment 3 is located in the Lower Santa Cruz Hydrologic Map Unit, which is a sub-basin of the Gila River Watershed. The most prominent feature in this area is the McClellen Wash, which runs parallel to the alignment in or near the environmental study limits between MPs 349 and 352. The wash in this area ranges from 30 to 50 feet wide, with high, steep cut banks. Fifteen other well-defined ephemeral drainages from 3 to 13 feet also are present within the environmental study limits along this segment of the alignment. The pipeline also would cross the Santa Rosa Canal at approximately MP 364.6.

3.6.1.4 Segment 4

Saltbush scrub (approximately 18.16 miles) is the dominant habitat type along Segment 4. Disturbed roadside vegetation, consisting of a mix of grasses, shrubs, and weeds, occur within approximately 14.6 miles along this segment. The Gila River crossing consists of dense tamarisk. This riparian crossing is approximately 1 mile in length. Agricultural land occurs within approximately 0.9 mile of Segment 4.

Segment 4 also is within the Lower Santa Cruz Hydrologic Map Unit. The Gila River is the most prominent feature along this segment of the alignment. The headwaters of the Gila River originate in the Black Mountains in western New Mexico and flows west to the Colorado River. Flows in the river are regulated by several dams, and reservoirs have been constructed along the river. Agricultural withdraws downstream of the San Carlos Reservoir cause the river to run dry in the reach between Florence and the Colorado River with flows only in response to heavy precipitation events and/or releases from upstream dams. The proposed alignment would cross the Gila River between MPs 411 and 412. In this area the broad river channel is characterized by dense growth of salt cedar. The other prominent feature in this segment is the Santa Cruz Wash. The alignment crosses this feature in three locations. Near MP 391, the alignment crosses a wide section of the wash bounded by levees. Upland vegetation was scattered throughout the channel and no recent evidence of flow was noted in this area. The second crossing occurs near MP 397, where the channel was under construction to create well-defined sloped banks and an open channel to facilitate water conveyance in this area. The third crossing was located on the GRIC land near MP 410. In this area the wash was a large, open, sandy channel approximately 180 feet wide with several smaller braided tributary channels running roughly parallel to the main drainage channel. Fourteen other well-defined drainages ranging from small 3-foot-wide sandy gravel channels to broad 100-foot-wide arroyos also were observed along this segment.

3.6.1.5 Ancillary Facilities

The general settings of the ancillary facilities are similar to the descriptions provided above, mainly predisturbed vacant Chihuahuan or Sonoran Desert environment. The 35-acre site for the proposed breakout facility on Segment 1 consists of mesquite desert with disturbed roadside vegetation along the perimeter of the property. The pump stations, terminals, valves, scraper stations, cathodic protection test stations, and pipeline markers have habitat types consistent with the segments in which they are located.

3.6.2 Environmental Consequences

3.6.2.1 Proposed Action

Appendix E provides a summary of all of the sample locations and features identified in the environmental study area within the 200-foot study corridor. Locations of the wetland sample points are shown on the attached maps. A brief description of the major features identified within each segment is provided below. Consultation is ongoing with the Army Corps of Engineers and Environmental Protection Agency in obtaining a Nation Wide Permit and would be completed prior to issuance of the Notice to Proceed and ROW grant.

Segment 1. No wetland features or waters of the United States were identified in this segment; therefore, no impacts would occur with implementation of the proposed project.

Segment 2. Under the Proposed Action, all ephemeral drainage channels within the temporary construction ROW in Segment 2 would be disturbed for underground placement of the pipe. However, the San Simon River would be crossed using a HDD method and therefore not disturbed. Excess material from boring would be disposed of offsite. Construction activities would be conducted while there is no flowing water or less than 6 inches of water in the channel. Areas within the ROW would be recontoured to original grade following construction activities. Therefore, the Proposed Action would not affect the function of any of the waterways within Segment 2.

Segment 3. Under the Proposed Action, all ephemeral drainage channels within the temporary construction ROW in Segment 3 would be disturbed for underground placement of the pipe. Construction activities would be conducted while there is no flowing water or less than 6 inches of water in the channel. Areas within the ROW would be recontoured to original grade following construction activities. Excess material from boring would be disposed of offsite. Therefore, the Proposed Action would not affect the function of any of the waterways within Segment 3.

Segment 4. Under the Proposed Action, all ephemeral drainage channels within the temporary construction ROW in Segment 4 would be disturbed for underground placement of the pipe. However, Santa Cruz Wash would be crossed using a HDD method and therefore not disturbed. Excess material from boring would be disposed of offsite. Construction activities would be conducted while there is no flowing water or less than

6 inches of water in the channel. Areas within the ROW would be recontoured to original grade following construction activities. Therefore, the proposed action would not affect the function of any of the waterways within Segment 4.

Ancillary Facilities. No wetland features or waters of the United States were identified at the site proposed for ancillary facilities; therefore, no impacts would occur with implementation of the proposed project.

3.6.2.2 No Action Alternative

Under the No Action Alternative, no pipeline expansion would occur and no ground-disturbing activities would take place. Wetlands or waters of the United States within the proposed project area would remain unchanged, and therefore, would not be affected. No mitigation would be required.

3.7 Biological Resources

Information sources for biological resources included field surveys, reference books, journal articles, websites, government databases, topographic maps, aerial photography, other projects in the vicinity of the proposed pipeline, and personal communications with agency personnel. As it pertains to biological resources, the 'project area' is defined as 100 feet on either side of the proposed centerline or periphery of proposed facilities. This section addresses vegetation, wildlife, and wildlife habitat. Special status species of plant and wildlife are treated separately in Section 3.8.

Reconnaissance surveys performed in April and May 2004 characterized the vegetation and wildlife habitat within the project area. Surveyors employed a combination of vehicular and pedestrian surveys. These surveys delineated the project area into vegetation/habitat types based on changes in either vegetation or wildlife habitat conditions (e.g., substrate, topography). Descriptions were adapted from those of Brown's (1982) biotic communities (vegetation and wildlife habitat) of the Southwest. Conditions were evaluated within 100 feet on either side of the proposed pipeline for its potential to support special status species of plant and wildlife. Survey results are listed in Appendix F of this document. Lists of species protected by the Endangered Species Act (ESA), or candidates for protection, for all counties traversed by the project were reviewed prior to conducting field surveys.

Reconnaissance surveys performed categorized the area into one of eight vegetation/habitat types as described below:

1. <u>Mesquite Desert</u>—A type of semi-desert grassland where mesquite is dominant to monoculture, but segregates spatially and does not form a continuous canopy. In New Mexico, this also may occur in upland sand flats and sand dunes, forming hummocks.

2. <u>Semi-desert Grassland</u>—In New Mexico and Arizona, grasses are dominant to co-dominant with scrub/shrub and succulents. In eastern New Mexico, homogeneous stands of grasses and shrubs mix together or patchy mosaics of grassland and scrubland occur.

3. Creosotebush Scrub—Creosotebush is dominant to monoculture, but segregates spatially and does not form a continuous canopy.
4. Yucca Grassland—A type of semi-desert grassland where grasses and yucca are co-dominant. Shrubs also may be co-dominant. Habitat shifts to scrub when shrubs dominate. Similar transition zone gradation occur between yucca grassland and grassland.
5. Desertscrub—Shrubs and sub-shrubs dominate. Mesquite is frequently dominant and shrubs do not typically form a continuous canopy.
6. Salt Playas—Dominated by salt tolerant grasses and other herbaceous, or unvegetated areas. These areas are within basins with high soil salt/mineral content. Salt playas are seasonally or occasionally flooded or saturated.
7. Agricultural Land—Areas used for growing commercial crops. Agricultural vegetation present.
8. Disturbed Roadside Vegetation—Areas along roadsides or railroads that are dominated by noxious weeds with few native grasses or shrubs.

3.7.1 Vegetation

3.7.1.1 Affected Environment

The proposed project area is situated within the Basin and Range Physiographic Province characterized by broad, low-elevation valleys (basins) surrounded by mountain ranges. The proposed alignments would remain primarily within these valleys avoiding mountainous terrain.

The proposed project route passes through both the Chihuahuan and Sonoran Deserts. The Chihuahuan Desert covers parts of western Texas, southern New Mexico, and southeastern Arizona and, therefore, encompasses Segments 1 and 2. It also extends south in the Mexico, covering much of the state of Chihuahua. The Chihuahuan Desert is a cold, high desert with frequent hard frosts and a single rainy season in the summer. Typical floral growth forms are low shrubs and succulents and small cacti. Chihuahuan floristic composition is dominated by species of colder climate origins. With rare exceptions in riparian areas, continuous canopy closure is nonexistent, and groundcover is intermittent, with significant areas of exposed ground.

The Sonoran Desert covers parts of southwestern Arizona and southeastern California, as well as most of Baja California and the western half of the state of Sonora, Mexico. It encompasses all of Segments 3 and 4. Unlike the Chihuahuan Desert, large cacti and small trees are predominant in many areas of the Sonoran Desert. This is a comparatively warm desert with the vegetation being of tropical and subtropical origin. The Sonoran Desert's bi-seasonal rainfall creates relatively lush vegetation in comparison with most other deserts.

The proposed project areas traverse varied vegetation/habitat types within these two deserts. These vegetation/habitat types include mesquite desert, semi-desert grassland, creosotebush scrub, yucca grassland, desertscrub, dense mesquite/wash, saltbush scrub, salt playas, agricultural land, and disturbed roadside vegetation. Much of the project area is located immediately adjacent to the existing SFPP East Line ROWs, other linear utilities, I-10, and the UPRR. As a result, portions of the project area are disturbed and support relatively low densities of native vegetation, or areas where native vegetation has been recently restored, or are adjacent to such areas.

Segment 1. Segment 1 is entirely within the mesquite desert vegetation/habitat type (Table 3.7-1). The landscape is dominated by sand dunes with shrubby mesquite covering stabilized hummocks. Saltbush (*Atriplex* spp.), snakeweed (*Gutierrezia sarothrae*), and yuccas (*Yucca* spp.) are scattered throughout the area as well.

TABLE 3.7-1
Vegetation/Habitat Types–Segment 1

Vegetation/Habitat Type	Miles
Mesquite Desert	6.2

Segment 2. Segment 2 traverses a mosaic of Chihuahuan desertscrub and semi-desert grassland as mapped by Brown and Lowe (1980). Chihuahuan desertscrub habitats are dominated by shrub species such as creosotebush (*Larrea tridentata*). Grasses are not particularly abundant in the desertscrub habitats, but the diversity of plants, including shrubs, cacti, and forbs, are often relatively high. The semi-desert grassland areas are often dominated by grasses such as tobosa (*Hilaria mutica*), sideoats (*Bouteloua* spp.), tanglehead (*Heteropogon contortus*) as well as several other grass species. However, other common plants of semi-desert grassland include yuccas (*Yucca* spp.) as well as shrubby mesquite (*Prosopis* spp.), which are generally considered an invader of historically overgrazed grassland. The xero-riparian scrub associations occur in ephemeral drainages supporting trees and large shrubs. Larger mesquite is the most common tree species in these drainages.

Table 3.7-2 lists the habitat types along with approximate amounts within Segment 2.

TABLE 3.7-2
Vegetation/Habitat Types–Segment 2

Vegetation/Habitat Type	Miles
Mesquite Desert	65.4
Semi-Desert Grassland	45.3
Creosotebush Scrub	28.3
Yucca Grassland	13.6
Desertscrub	7.8
Salt Playa	5.8
Agricultural	1.6
Riparian	0.2
Bare Ground	1.0

TABLE 3.7-2
Vegetation/Habitat Types–Segment 2

Vegetation/Habitat Type	Miles

Segment 3. Segment 3 is wholly within the Sonoran Desert traversing areas mapped by Brown and Lowe (1980) as Lower Colorado River and Arizona Upland subdivisions of Sonoran desertscrub biome. The project area supports vegetation/habitat types characteristic of both biomes (Brown and Lowe, 1994). Common plant species within the Lower Colorado River subdivision include creosotebush (*Larrea tridentata*), desert broom (*Baccharis sarothroides*), brittlebrush (*Encelia farinosa*), saltbush (*Atriplex* spp.), and white bursage (*Ambrosia dumosa*). Some creosotebush, mesquite, and other desert forbs and grasses also are present in various densities throughout most of the project area.

The typical Arizona Upland vegetation is generally lacking, or poorly developed, in the project area. Foothills palo verde (*Cercidium microphyllum*), ironwood (*Olneya tesota*), and a few saguaro cacti (*Carnegiea gigantea*) are present in upland areas, but in low numbers. A few large other cacti present in this area include barrel cactus (*Ferocactus* spp.) and pincushion cactus (*Mammillaria* spp.), prickly pear (*Opuntia* spp.), chollas (*Opuntia* spp.), and hedgehogs (*Echinocereus* spp.) scattered throughout the understory.

Large washes support velvet mesquite (*Prosopsis velutina*), blue palo verdes (*Cercidium floridum*), catclaw acacias (*Acacia greggii*), desert hackberry (*Celtis spinosa*), and ironwoods. Adjacent to I-10 and the fence line of railroad ROW are large trees (primarily blue palo verde and mesquite), which benefit from increased runoff from the highway. Washes that dissect desertscrub support a greater diversity of plants in terms of both species and structural composition.

Large patches of bare ground supporting no perennial vegetation are interspersed with vegetated areas through the project area.

Agricultural lands also are present within the project area. Active agricultural areas for row crops and cattle grazing are adjacent to the roadway. The project area includes active agricultural croplands.

Table 3.7-3 lists the habitat types along with approximate amounts within Segment 3.

TABLE 3.7-3
Vegetation/Habitat types–Segment 3

Vegetation/Habitat Type	Miles
Mesquite Desert	5
Creosotebush Scrub	3.3
Sonoran Desertscrub	7.4
Agricultural	12.5
Dense Mesquite/Wash	2.7

TABLE 3.7-3
Vegetation/Habitat types–Segment 3

Vegetation/Habitat Type	Miles

Segment 4. Segment 4 is completely within the Lower Colorado subdivision of Sonoran desertscrub (Brown and Lowe, 1980). Undeveloped areas support a saltbush scrub accounting for approximately 18.2 miles of this segment. In these areas saltbush is the most common, and frequently, the only plant cover for much of the proposed alignment. The saltbush tends to segregate spatially and does not form a continuous canopy. Much of the area is bare ground as a result of high soil salinity and surface disturbance. The saltbush scrub intergrades creosotebush scrub toward the north end of the project area as the proposed alignment enters developed areas in the Town of Levine. Disturbed roadside vegetation, consisting of a mix of grass, shrubs, and weeds, make up 45 percent of this segment.

Several large ephemeral drainages cross the project area. These typically support large, but widely scattered, mesquite trees. At the Gila River crossing is a 1-mile wide swath of relatively thick and tall salt cedar.

Table 3.7-4 lists the habitat types along with approximate amounts within Segment 4.

TABLE 3.7-4
Habitat Types–Segment 4

Vegetation/Habitat Type	Miles
Agricultural	.9
Riparian (Tamarisk)	1
Saltbush scrub	18.2
Disturbed roadside vegetation	14.6

Ancillary Facilities. The 35-acre site for the proposed breakout facility on Segment 1 consists of mesquite desert with disturbed roadside vegetation along the perimeter of the property. The pump stations, terminals, valves, scraper stations, cathodic protection test stations, and pipeline markers have habitat types consistent with the segments in which they are located.

3.7.1.2 Environmental Consequences

Proposed Action. Under the Proposed Action, all vegetation within the construction ROW would be disturbed for underground placement of the pipe. Segment 1 would be 6.2 miles in length, which totals approximately 75 acres of disturbance. An additional 35 acres would be disturbed on Segment 1 for the construction of a breakout facility. This disturbance would be permanent since the facility would be a permanent structure on the site. Segment 2 would be 161 miles in length, which totals approximately 1,952 acres of disturbance. Segment 3 would be 31.2 miles in length, which totals approximately 378 acres of disturbance. Segment 4 would be 34.8 miles in length, which totals approximately 422 acres of disturbance.

However, after construction activities have been completed, the ROW would be recontoured to its original grade and vegetation allowed to grow to its natural state. Where reseeding is required, the ROW would be seeded with a certified weed-free native seed mixture not to exceed 15 pounds per acre. Natural revegetation would not occur at the locations of any ancillary facilities such as the new breakout facility, scraper stations, or pump stations and terminals since these would be permanent structures. The scraper stations would be located entirely within the ROW.

No Action Alternative. Under the No Action alternative, no ground-disturbing activities would occur for the proposed project areas. The No Action Alternative would have no immediate affect on vegetation. No mitigation would be required. However, continued aging of the existing pipeline could lead to increased maintenance activities. Such activities could be in emergency situations, which could lead to unforeseen impacts to vegetation. The No Action Alternative does not meet the objectives of the project's purpose and need.

3.7.2 Wildlife and Wildlife Habitats

3.7.2.1 Affected Environment

With regards to wildlife and wildlife habitat, the project area was categorized in the field as to vegetation/habitat types based on changes in either vegetation or other wildlife habitat features (e.g., substrate, topography). These types are described and quantified in the preceding section on vegetation (Section 3.7.1). Important regional wildlife habitat types that are not part of the project area include mountain and other upland areas with some minor exceptions (e.g., Peloncillo Mountain Pass). Likewise, high value riparian habitat is not present in the project area with the exception of the 0.2 mile of broadleaf (cottonwood) habitat crossed in the San Simon valley in the Arizona portion of Segment 2. Important riparian habitats in the region associated with the Rio Grande, San Pedro, Santa Cruz, and Salt Rivers are not crossed by the proposed project. The proposed project crosses numerous desert washes that can be important wildlife movement corridors. However, in many cases these washes value to wildlife movement is disrupted by the presence of I-10 and the UPRR.

Many wildlife species are common to both the Chihuahuan and Sonoran Desert communities. Reptile species characteristic of both deserts include whiptail lizards (*Cnemidophorus* spp.), zebra-tailed lizard (*Callisaurus draonoides*), tree lizard *(Urosaurus ornatus)*, side-blotched lizard (*Uta stansburiana*), gopher snake (*Pituophis melanoleucus*), and western diamondback rattlesnake (*Crotalus atrox*). Bird species include cactus wren (*Campylorhynchus brunneicapillus*), greater roadrunner (*Geococcyx californianus*), curve-billed thrasher (*Toxostoma curvirostre*), and red-tailed hawk (*Buteo jamaicensis*). Characteristic and common mammals include the white-throated woodrat (*Neotoma albigula*), Merriam's kangaroo rat (*Dipodomys merriami*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus auduboniil*), and coyote (*Canis latrans*).

The Migratory Bird Treaty Act of 1918 (MBTA), as amended (16 United States Code [USC] 703-712) is an international agreement between the United States, Canada, and Mexico that protects designated species of birds. Virtually all birds are protected under the MBTA, with four exceptions (California quail, English sparrows, common pigeons, and European starlings). A complete list of all species of all migratory birds protected by the MBTA can be found at 50 CFR 10.13. The MBTA controls the taking of these birds, their nests, eggs, parts, or products.

Segment 1. The wildlife habitats present within Segment 1 are characteristic of mesquite desert landscape of the Chihuahuan Desert region. Coyotes, jackrabbits, and desert cottontails are most certainly common mammals in the area. Bird species such as the red-tailed hawk, western kingbird, and scaled quail (*Callipepla squamata*) are common to the area as well. Collared lizards and whiptails are common reptile species found in the area.

Segment 2. Vegetation/habitat types within Segment 2 are primarily a mosaic of semi-desert grasslands and Chihuahuan desertscrub. The length of this segment and the many vegetation/habitat types traversed resulted in a wide variety of wildlife species being observed during field surveys. The western whiptail lizard (*Cnemidophorus tigris*), zebra-tailed lizard, side-blotched lizard (*Uta stansburiana*), paint desert glossy snake (*Arizona elegans philipi*), and gopher snake are reptiles species observed in this segment.

Birds typically associated with semi-desert grasslands and Chihuahuan desertscrub observed during field surveys included Swainson's hawk (*Buteo swainsoni*), American kestrel (*Falco sparverius*), scaled quail (*Callipepla squamata*), western burrowing owl (*Athene cunicularia*), Say's phoebe (*Sayornis saya*), Chihuahuan raven (*Corvus cryptoleucus*), loggerhead shrike (*Lanius ludovicianus*), and western meadowlark (*Sturnella neglecta*).

Mammals typically associated with semi-desert grassland and Chihuahuan desertscrub and observed in the project area included desert cottontail, black-tailed jack rabbit, round-tailed ground squirrel *(Spermophilus terticaudus)*, coyote, mule deer (*Odocoileus hemionus*), and pronghorn antelope (*Antilocarpra Americana*).

Segment 3. Wildlife observed in the Segment 3 are characteristic of the Sonoran Desert but must be adapted to continual highway traffic noise, and ongoing maintenance activities associated with adjacent linear facilities. Washes that dissect desertscrub support a greater diversity of plants in terms of both species and structural composition and, therefore, a greater variety of wildlife.

Reptiles observed in the project area include the western whiptail (*Cnemidophorus tigris*). Common birds included the Harris' hawk (*Parabuteo unicinctus*), white-winged dove (*Zenaida macroura*), Gila woodpecker (*Melanerpes uropygialis*), Bendire's thrasher (*Toxostoma bendirei*), and northern cardinal (*Cardinalis cardinalis*). Common mammal species observed in the project area included the round-tailed ground squirrel (*Spermophilus tereticaudus*), desert woodrat (*Neotoma lepida*), and coyote.

Segment 4. The project area within Segment 4 is predominately within saltbush scrub and disturbed roadside vegetation/habitat types. In general, these types do not provide good wildlife habitat. Common reptile species observed during field surveys in the project area included the western whiptail and western diamondback rattlesnake. Bird species observed are common throughout the Southwest region and include the white-winged dove, mourning dove, red-tailed hawk, and western kingbird. The black-tailed jackrabbit, desert cottontail, and coyote are common resident mammals observed in the project area. Wild horses (*Equus caballus*) are common within the GRIC.

Ancillary Facilities. The 35-acre site for the proposed breakout facility on Segment 1 contains similar Chihuahuan Desert wildlife habitat as the remainder of the segment. However, the proposed facility site is partially disturbed and bordered by highways on each side. The pump stations, terminals, valves, scraper stations, cathodic protection test stations, and pipeline markers have wildlife habitats consistent with the segments in which they are located.

3.7.2.2 Environmental Consequences

Proposed Action. During construction, it is likely that wildlife would be affected by habitat alteration (e.g., disturbance to vegetation) and temporary displacement (e.g., construction noise). However, much of the project area parallels existing linear facilities including access roads, I-10 and frontage roads, UPRR, fiber optic cables, and other pipelines. Thus, wildlife in the project area is currently exposed to noise and other human disturbances. The addition of the Proposed Action in these portions of the project area would represent a minor increase in exposure to noise and other potentially disturbing activities resulting from construction, operation, and maintenance activities.

There would be short-term and long-term losses of wildlife habitat resulting from the Proposed Action due to ROW clearance and new access roads and access road improvements. Some clearance would include areas of relatively undisturbed wildlife habitat. However, the affected vegetation/habitat types (e.g., semi-desert grassland, creosotebush scrub) are widespread throughout the Chihuahuan and Sonoran Desert regions as are the wildlife they support. There are desert washes crossed by the proposed project that may be utilized as wildlife corridors. Impacts from construction activities within the washes would be of short duration. Long-term impacts to wildlife utilizing these corridors are expected to be minimal.

During construction, a 5- to 6-foot-deep and 2- to 3-foot-wide ditch is typically excavated. An open ditch can be hazardous to wildlife in that they can become trapped in the open ditch. It is recommended that the open ditch be checked regularly to remove any trapped wildlife.

Impacts to migratory birds would be avoided by not disturbing active nests during the breeding season. On the Fort Bliss Military Reservation, it is likely that grading/clearing activity would take place during the breeding season, February 15 through September. This would likely disturb an estimated two migratory bird nests. The disturbance of two nests is not considered to be a significant number and would not have a significant effect on the nesting success of any particular migratory bird species. No active bird nests have been located in the areas of proposed constructions along any of the four segments. Golden eagles, protected under the MBTA and Bald Eagle Protection Act, would not be affected by the Proposed Action. Although an individual was observed flying during reconnaissance surveys of Segment 2 (Appendix F), no nesting habitat occurs within or adjacent to the ROW.

Proposed staging areas, laydown areas, pump stations, and expansion of existing terminals are typically clear of vegetation and are situated in developed and previously disturbed areas.

No Action Alternative. Under the No Action Alternative, no ground-disturbing activities would occur for the proposed project areas. The No Action Alternative would have no immediate affect on wildlife. No mitigation would be required. However, continued aging of the existing pipeline could lead to increased maintenance activities. Such activities could be in emergency situations, which could lead to unforeseen impacts to wildlife.

3.8 Special Status Species

Special status species are species listed by the U.S. Fish and Wildlife Service (USFWS) as threatened, endangered, proposed for listing as threatened or endangered, or are candidates for protection under the ESA. Also included here are sensitive species on lists maintained by the BLM, New Mexico Department of Game and Fish (NMDGF), and the Arizona Game and Fish Department (AGFD).

Definitions for species on USFWS lists are:

- Endangered (E) = Any species that is in danger of extinction throughout all or a significant portion of its range.
- Threatened (T) = Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
- Proposed (PT, PE) = Any species that has been proposed for listing as a threatened or endangered species.
- Candidate (C) = Any species for which there is sufficient information on biological vulnerability and threats to support a proposal to list as endangered or threatened but for which preparation and publication of a proposal is precluded by higher-priority listing actions.

The BLM maintains a list of species considered "sensitive" (BLM-S). The definition for sensitive is "…those taxa occurring on BLM Field Office Lands in New Mexico/Arizona which are considered sensitive by the New Mexico/Arizona State Office."

The NMDGF maintains a list of Wildlife of Concern that includes species categorized as endangered, threatened, or sensitive. The NMDGF maintains a database of information on these species within the state as well as those protected by the federal ESA. The AGFD maintains a list of Wildlife of Special Concern in Arizona (WSCA). These are defined as species whose occurrence in Arizona is or may be in jeopardy, or known or perceived threats or population declines, as described by the AGFD's listing of WSCA (AGFD, in prep.). These are currently the same as those in the Threatened Native Wildlife in Arizona (AGFD, 1988).

Each species was evaluated in terms of the likelihood of it occurring in the project area and then the potential for the species, or its habitat, to be impacted by the proposed project.

3.8.1 Affected Environment

The following is a description of the special status species that may potentially be affected by implementation of the Proposed Action. Table 3.8-1 lists these species and their status. No Designated Critical Habitat for any special status species exists on or near the proposed project areas. However, a portion of the proposed project area is within Proposed Critical Habitat for the cactus ferruginous pigmy owl.

Forty-four additional special status species are known to occur or may potentially occur within the Texas, New Mexico, and Arizona counties through which the proposed project passes. Observation of the proposed ROW and the surrounding area indicated that no suitable habitats exist for these species on or near the project area. Therefore, these species would not be impacted as a result of the proposed project and have been eliminated from further consideration. These 44 species are identified in Appendix G of this document.

Cactus ferruginous pygmy-owl. The cactus ferruginous pygmy-owl (CFPO) (*Glaucidium brasilianum cactorum*) was listed as endangered by the USFWS on March 3, 1997 (62 FR 10730) and also is on the list of WSCA (AGFD, in prep.). The species ranges from lowland south-central Arizona and extreme southeastern Texas and south through Mexico. It is common in Mexico.

TABLE 3.8-1
Special Status Species Potentially Affected by the Proposed Action

Common Name	*Scientific Name*	Status
Cactus ferruginous pigmy-owl	*Glaucidium brasilianum cactorum*	ESA-Endangered
Northern aplomado falcon	*Falco femoralis septentrionalis*	ESA-Endangered
Western burrowing owl	*Athene cunicularia*	BLM Sensitive
Jaguar	*Panthera onca*	ESA-Endangered
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	ESA-Endangered
Cave myotis	*Myotis velifer*	BLM Sensitive
Fringed myotis	*Myotis thysanodes*	BLM Sensitive
Mexican long-nosed bat	*Leptonycteris nivalis*	ESA-Endangered
Mexican long-tongued bat	*Choeronycteris mexicana*	BLM Sensitive, AZ-WC
Western small-footed myotis	*Myotis cillolabrum*	BLM Sensitive
California leaf-nosed bat	*Macrotis californicus*	BLM Sensitive, AZ-WC
Desert tortoise-Sonoran population	*Gopherus agassizi*	BLM Sensitive, AZ-WC
Texas horned lizard	*Phrynosoma cornutum*	BLM Sensitive
Acuna cactus	*Echinomastus erectocentrus acunensis*	ESA-Candidate
Sand prickly-pear cactus	*Opuntia arenaria*	New Mexico - Threatened

TABLE 3.8-1
Special Status Species Potentially Affected by the Proposed Action

Common Name	*Scientific Name*	Status

Notes:
ESA-Endangered—A species that is considered to be in danger of extinction throughout all or a significant portion of its range and is listed under the ESA.

ESA-Candidate—Any species for which there is sufficient information on biological vulnerability and threats to support a proposal to list as endangered or threatened under the ESA but for which preparation and publication of a proposal by the USFWS is precluded by higher-priority listing actions.

BLM Sensitive—Species occurring on BLM land that are considered sensitive by the state offices.

New Mexico - Threatened—A species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range in New Mexico as determined by the NMDGF.

AZ-WC = Wildlife of Special Concern in Arizona—Species whose occurrence in Arizona is or may be in jeopardy, or with known or perceived threats or population declines, as described by the AGFD's listing of Wildlife of Special Concern in Arizona October 1996 Draft.

The CFPO is a small reddish brown or grayish bird that is found in Sonoran desertscrub habitats characterized by braided wash systems and dense vegetation including ironwood, mesquite, and palo verde; and semi-desert grasslands containing drainages with mesquite, hackberry, and ash. Suitable nesting habitat for the CFPO is defined as areas below 4,000 feet in elevation containing saguaro cacti or other columnar cacti that are at least 8-feet tall, or ironwood, mesquites, palo verde, or other large trees with a trunk diameter of at least 6 inches in diameter at breast height (dbh as measured at 4.5 feet above the ground) (AGFD and USFWS, 2000). Recent observations of CFPOs have been primarily within the Arizona Upland Subdivision of the Sonoran desertscrub. These small owls nest in cavities in such forms of vegetation during late winter and early spring. Juveniles typically disperse from natal areas between July and August and do not appear to defend a territory until September. Direction of dispersal appears to be random and the owl is capable of dispersal up to 22 miles.

Northern aplomado falcon. The northern aplomado falcon (*Falco femoralis septentrionalis*) was listed as endangered on February 25, 1986 (51 FR 6686). Aplomado falcons are long-tailed neotropical falcons intermediate in size between the American kestrel and the prairie falcon. It is typically a species of open habitats in North and Central America, ranging from coastal prairie and other grasslands through tropical savanna to open woodlands containing oaks *(Quercus* spp.*)* and pines *(Pinus* spp.*)*. The species also has been reported in desert grasslands. Suitable habitat for the northern aplomado falcon occurs within the semi-desert grasslands within the Chihuahuan Desert. Historically, aplomado falcons were reported from Dona Ana, Eddy, Grant, Hidalgo, Lea, Luna, Otero, and Sierra Counties within New Mexico (U.S. Fish and Wildlife Service, 1999). Potentially suitable habitat exists along portions of Segment 2 just east and west of Deming, New Mexico, in areas of relatively dense, tall yuccas that represent potential perching and nesting sites.

Aplomado falcons do not build their own nests, but use the nests of corvids such as ravens and other raptors, including Swainson's hawks and crested caracaras. Falcons will roost in the boughs of yuccas, mesquites, and similar vegetation when they are unable to locate suitable preexisting nest structures. Nesting occurs from March to June in northern Chihuahua, Mexico. The falcon's diet consists primarily of insects and small birds with insects accounting for more than 60 percent of the falcon's prey, but birds account for more than 90 percent of prey biomass. They also have been known to feed on bats, small rodents, lizards, and snakes.

Western burrowing owl. The western burrowing owl (*Athene cunicularia*), a BLM-Sensitive species, occupies open areas, such as grasslands, desertscrub, and the edges of agricultural fields. They also inhabit golf courses, airports, cemeteries, vacant lots, and road embankments or wherever there is sufficient friable soil for a nesting burrow, which is a critical habitat requirement for burrowing owls. Owls use these burrows for nesting and also require access to alternate burrows providing escape cover for adults and fledglings. Burrowing owls are dependent on fossorial mammals such as badgers, ground squirrels, and prairie dogs to create burrows. In southern Arizona and New Mexico, most owls are year-round residents.

Suitable habitat for the burrowing owl occurs in portions of the project area adjacent to agricultural fields and open grasslands. Because burrowing owls are year-round residents to the area, there is a potential for impact. The burrowing owl is protected under the MBTA, which states that it is unlawful to take, kill, or possess migratory birds (16 USC 703-711). Potential for impacts on migratory birds is primarily a concern during the breeding season, which occurs during the spring and summer for burrowing owls and other species as well.

Jaguar. The jaguar (*Panthera onca*) was federally listed as endangered throughout its historic U.S. range, including New Mexico and Arizona, on July 22, 1997 (62 FR 39147). The range of the species extends south through Central and South America. Jaguars occupy a wide range of habitats including tropical rain forests and deserts. In the northern edge of the species' range (including Arizona and New Mexico), its habitat is described as including arid mountain scrub and oak/pine woodlands. As with other large predators, suitable habitat is likely to be related to the prey base rather than the vegetation type. The closest known population is 135 miles south of the international border in Sonora, Mexico. Individuals wondering north into New Mexico and Arizona are part of that population (Rinkevich and Bashum, 2003). Illegal shooting is the greatest threat to the jaguar in the United States.

Lesser long-nosed bat. The lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) was listed as endangered by the USFWS on September 30, 1988 (53 FR 38456) without designated critical habitat. It also is considered a WSCA by the AGFD (in prep.). The lesser long-nosed bat is a medium-sized bat with a distinctively elongated nose with a leaf-shaped tip. Their known range extends from extreme southwestern New Mexico and southeastern Arizona north to the Phoenix area, west to the Aqua Dulce Mountains, and south through western Mexico (USFWS, 1995).

Lesser long-nosed bats are summer residents within semi-desert grasslands and Sonoran desertscrub, Arizona Upland Subdivision up to the edge of oak woodland (Hoffmeister, 1986; USFWS, 1995). They begin migration into Arizona in early April. When they arrive, the females are pregnant and congregate in maternity colonies while males occupy separate roosts. The young are born between early May and late June (Hoffmeister, 1986). They migrate south in the fall, leaving Arizona and New Mexico by early October (Hayward and Cockrum, 1971). Lesser long-nosed bats are nectar and pollen feeders, foraging at night in areas of saguaro and agave. While feeding, they either land on the plant or hover like a hummingbird (Hoffmeister, 1986). Lesser long-nosed bats fly long distances (up to 75 miles) between roosting and feeding areas (USFWS, 1995). During the day they roost in mine tunnels and natural caves (Hayward and Cockrum, 1971). Threats to the lesser long-nosed bat have been identified as the destruction or disturbance of roosting sites and possible loss of agave populations.

Most known roost sites for lesser long-nosed bats are inactive mines. Because the proposed project area does not support dense stands of mature saguaro and this species has been reported to travel long distances to forage, lesser long-nosed bats could forage in the project area. However, there are no concentrations of agaves to assess lesser long-nosed bat foraging habitat in westernmost portion of Segment 2.

Cave myotis. The cave myotis (*Myotis velifer*), a BLM-Sensitive species, occurs in desertscrub areas of the region in conjunction with water sources. This species is dependent on mine shafts and tunnels for roosting. This species is a colonial cave dwelling bat. They also may roost in rock crevices, old buildings, carports, under bridges, and even in abandoned cliff swallow nests. The cave myotis forms nursery colonies, usually numbering in the thousands in caves, mines, barns, buildings, and sometimes under bridges. It is found throughout the southwest from central Oklahoma and Texas westward through the southern half of New Mexico and Arizona. Cave myotis are aerial insectivores and feed on a wide variety of insects including moths, weevils, antlions, small beetles, and flying ants. Because these bats congregate in large groups, they are very susceptible to human disturbance.

Fringed myotis. The fringed myotis (*Myotis thysanodes*), a BLM-Sensitive species, is known from low deserts and grassland areas to ponderosa pine and spruce-fir forests. This species ranges through western North America from Canada to southern Mexico. Fringed myotis roost in caves, mines, and buildings. Suitable habitat for roosting is present in mountain area adjacent to the project area where abandoned mines are present.

Mexican long-nosed bat. The Mexican long-nosed bat (*Leptonycteris nivalis*) is a BLM-Sensitive species as well as a WSCA by the AGFD (in prep.). This species roosts in small groups, usually in canyons, caves, and mine tunnels, but also in relatively exposed locations. They are found in Arizona from the Chiricahuas to the Santa Catalinas and Baboquivaris, and into southwestern New Mexico. Their preferred habitat is Sacaton grasslands, sycamore, cottonwood, rabbitbrush, oak savanna, and coniferous forest. This species winters in Mexico and is a resident of Arizona and New Mexico scrub habitat during the spring and summer months when the plant communities are flowering and nectar is abundant (AGFD, 1993).

Mexican long-tongued bat. The Mexican long-tongued bat (*Choeronycteris mexicana*) is a BLM-Sensitive species. Its range extends from the southern part of the southwestern United States to Honduras and Guatemala. In the United States, it is known mainly from desert habitats between 2,000 and 8,000 feet. The diet consists of nectar and pollen of night-blooming succulents. This species is known to use natural caves, buildings, and old mine tunnels for day roosts. Colonies usually contain several dozen bats, although solitary individuals and groups of 2 to 12 have been recorded.

Western small-footed myotis. The western small-footed myotis (*Myotis cillolabrum*), a BLM-Sensitive species, ranges over most of western North America. They are known from oak, chaparral, and riparian areas within the region. This species habitat requirements are poorly known; however, they are known to use natural caves, buildings, old mine tunnels, and tree bark for roost sites.

California leaf-nosed bat. The California leaf-nosed bat (*Macrotus californicus*) is a BLM-Sensitive species as well as a WSCA (AGFD, in prep.). These occur throughout the Mojave and Sonoran Deserts and occasionally in the Chihuahuan Desert. It is a year-round resident in desertscrub habitats (mostly Sonoran desertscrub) of southern and western Arizona south of the Mogollon Rim (Hoffmeister, 1986). They are locally common, roosting colonially in mines, caves, and under bridges (AGFD, 1988; Cockrum, 1980). California leaf-nosed bats remain active throughout the year in Sonoran desertscrub habitats due to the relatively mild climate and continuous availability of food. They feed primarily on large, night-flying beetles, grasshoppers, and moths that are taken in flight. They also feed on insect larvae, especially of butterflies, which are taken from the bushes or on the ground. There is some evidence that they also feed on fruits, including cacti. Their home range and local seasonal movements are largely unknown (Hoffmeister, 1986). Its numbers are thought to be low, apparently due to limited winter roosts and vandalism at roost sites (AGFD, 1988).

Desert tortoise. The desert tortoise (*Gopherus agassizii*), Sonoran Population, is a BLM-Sensitive special as well as a WSCA (AGFD, in prep.). Sonoran desert tortoises in Arizona range from the Kingman area south to the Chocolate Mountains (Arizona), and southeast to the San Pedro River area (Johnson et al., 1990; Palmer and Ladehoff, 1991). Sonoran desert tortoise habitat consists primarily of hills and rocky mountainous terrain of Arizona Upland Subdivision of the Sonoran desertscrub. While tortoises construct burrows throughout their range (Germano et al., 1994), they also use other kinds of shelter sites. Desert tortoises typically forage on plants, plant litter, and arthropods. The Sonoran Desert tortoise home range is estimated to be about 50 acres in size (Barrett, 1990).

Texas horned lizard. Texas horned lizards are flat-bodied lizards with numerous horns on the head and a brownish color. It is the only species of horned lizard to have dark brown stripes that radiate downward from the eyes and across the top of the head. Texas horned lizards hibernate from September–October until April–May, at which time they begin mating. These lizards are ant specialists, feeding on large amounts of harvester ants.

Acuna cactus. The Acuna cactus (*Echinomastus erectocentrus acunensis*) is a candidate for listing as threatened and endangered under the ESA. The historic range of this cactus includes Pinal, Pima, and possibly Maricopa Counties in Arizona, and in Sonora, Mexico. There are currently four populations in Arizona. The Organ Pipe National Monument has the largest known population. This is a small cactus less than 12 inches in height with a single stem and straight central spines. Acuna cactus is generally restricted to well-drained knolls and gravel ridges between major washes in the Sonoran desertscrub habitat between 1,300 and 2,000 feet elevation.

Sand prickly-pear cactus. Sand prickly pear (*Opuntia arenaria*) is a New Mexico threatened species known from a few localities in sandy soils including dunes, floodplains, and arroyos in extreme southeastern New Mexico. The range of this cactus includes southern Dona Ana, Luna, and Socorro Counties of New Mexico as well as adjacent El Paso County, Texas and Chihuahua, Mexico. This species has a distinctive appearance with much thicker and narrower stem joints compared to typical prickly pear. It more closely resembles a cholla. It is low growing with stems consisting of loosely attached flattened joints up to 8 centimeter (cm) in length by 2 to 3 cm in width. The cactus produces yellow flowers from May to June. Sand prickly pear can be found in sandy areas, particularly semi-stabilized sand dunes among open Chihuahuan desertscrub. It is often found with honey mesquite and a sparse cover of grasses at an elevation of 3,800 to 4,300 feet.

3.8.1.1 Segment 1

No potentially suitable habitat exists for special status species within Segment 1.

3.8.1.2 Segment 2

Northern aplomado falcon. Potentially suitable habitat exists along portions of Segment 2 just east and west of Deming, New Mexico. Northern aplomado falcons have not been recorded in Arizona since before to 1940. No individuals or nests were identified during field surveys of the project area. The approximately 14 miles identified as yucca grassland represents potential habitat in this segment.

Western burrowing owl. Burrowing owls are present along portions of Segment 2 and were observed near the proposed ROW during field surveys. They could potentially occupy any portion of this segment but is most likely to occur within open areas of semi-desert grassland (45 miles of Segment 2) or bare ground (1 mile of Segment 2). No active burrows were located in the areas of proposed construction during environmental surveys of the proposed ROW.

Jaguar. The project area is located in flats adjacent to potential jaguar habitat. If a jaguar were to travel as far north as the project area, it would likely be through the mountain habitats of the Peloncillo Mountains (MP 180 to MP 183).

Lesser long-nosed bat. This species may forage in the project area; however, there are no potential roost or maternity sites in the project area. The absence of dense stands of agave greatly reduces the potential for this species to forage in the area.

Cave myotis. This species may forage in the project area; however, there are no potential roost sites or maternity sites in the project area.

Fringed myotis. This species may forage in the project area; however, there are no potential roost or maternity sites in the project area.

Mexican long-nosed bat. This species may forage in the project area; however, there are no potential roost or maternity sites in the project area. The absence of dense stands of agave reduces the potential for this species to forage in the area.

Mexican long-tongued bat. This species may forage in the project area; however, there are no potential roost or maternity sites in the project area. Potential feeding habitat was observed in New Mexico and Arizona. However, abundant potential feeding habitat in proximity to potential roost habitat (mines, rock crevices, potential cave-like habitats) is limited to the Peloncillo Mountain Pass through which the pipeline passes (MP 180 to MP 183).

Western small-footed myotis. This species may forage in the project area; however, there are no potential roost sites or maternity sites in the project area.

Desert tortoise. Segment 2 is located within the range of the desert tortoise (Sonoran Population) and this species was identified by the AGFD as occurring within 3 miles of the proposed project area (Schwartz, 2004). Potentially suitable hillside habitat exists in the vicinity of Segment 2 near MP 206. No individuals or tortoise sign was observed during field surveys.

Texas horned lizard. Potentially suitable habitat exists along all portions of Segment 2 in the open areas with sparse plant cover. No individuals were observed during field surveys.

Sand prickly-pear cactus. Potentially suitable habitat exists for the sand prickly-pear cactus within the Segment 2 project area; however, this species is not known to occur in the vicinity of the project area and was not observed during field surveys.

3.8.1.3 Segment 3

Cactus ferruginous pygmy-owl. Limited portions of Segment 3 are located within potential breeding (MP 350 to MP 353) and dispersal habitat (MP 335.89 to MP 350) although no individuals are known to inhabit the area.

Western burrowing owl. Potentially suitable habitat is present within the project area. This species could occur in any of the areas of open, sparsely vegetated areas interspersed throughout this segment. Open agricultural fields interspersed adjacent to the ROW also provide suitable habitat. No owls or burrows were observed during field surveys.

Lesser long-nosed bat. This species may potentially forage in the project area; however, there are no potential roost or maternity sites in the project area. The AGFD identified this species as occurring within 3 miles of the project area (Schwartz, 2004), most likely within the Picacho Mountains adjacent to Segment 3 (between MP 350 and MP 355). The absence of dense stands of saguaro and agaves in the project area reduces the likelihood of the species foraging in the area.

Cave myotis. This species may forage in the project area; however, there are no potential roost sites or maternity sites in the project area. The AGFD identified this species as occurring within 3 miles of the project area (Schwartz, 2004), most likely within the Picacho Mountains adjacent to Segment 3 (between MP 350 and MP 355).

California leaf-nosed bat. This species may potentially forage in the project area; however, there are no potential roost or maternity sites in the project area. The AGFD identified this species as occurring within 3 miles of the project area (Schwartz, 2004), most likely within the Picacho Mountains adjacent to Segment 3 (between MP 350 and MP 355).

Desert tortoise. Potentially suitable habitat is present in the vicinity of the project area. No individuals or tortoise sign was observed during field surveys. Segment 3 is located within the range of the desert tortoise (Sonoran Population) and this species was identified by the AGFD as occurring within 3 miles of the proposed project area (Schwartz, 2004). The Picacho Mountains, adjacent to Segment 3 (between MP 350 and MP 355), are known to be occupied by tortoises.

Acuna cactus. Potentially suitable habitat exists along portions of Segment 3 that contain well-drained knolls and gravel ridges (MP 350 to MP 355). No individuals were observed during field surveys.

3.8.1.4 Segment 4

Western burrowing owl. Potentially suitable habitat is present throughout the project area. This species could occur within all habitat types with the exception of the dense riparian habitat associated with the Gila River. It would most likely occur within the open agricultural fields adjacent to the ROW. However, no owls or burrows were observed in this segment during field surveys.

Acuna cactus. Potentially suitable habitat is present within the project area. No individuals were observed during field surveys.

3.8.1.5 Ancillary Facilities

The 35-acre site for the proposed breakout facility on Segment 1 contains similar Chihuahuan Desert wildlife habitat as the remainder of the segment. No potentially suitable habitat exists for special status species within the proposed site. The pump stations, terminals, valves, scraper stations, cathodic protection test stations, and pipeline markers have wildlife habitats consistent with the segments in which they are located and therefore have similar potential habitats for special status species. No individual special status species were observed at any of the proposed ancillary facility sites during field surveys.

3.8.2 Environmental Consequences

3.8.2.1 Proposed Action

The following summarizes the effects of the Proposed Action alternative on special status species potentially occurring within the project area.

Segment 1. The Proposed Action would have no impact on special status species or their potential habitats within Segment 1. No special status species or their potential habitats have been identified within Segment 1.

Segment 2. The Proposed Action would have the following environmental consequences in Segment 2:

Northern aplomado falcon—The Proposed Action would have no direct effects on individual aplomado falcons. The Proposed Action may have an indirect effect on potential breeding and foraging behavior in the area during the period in which construction activities take place. This potential impact would be minimal considering the amount of foraging area and suitable vegetation surrounding the proposed project area and the BMP of avoiding, to the extent possible, large yuccas that may provide potential nest habitat (see W3 of Table 2.3-1). Yuccas to be avoided would be flagged prior to construction. Additionally, the proposed project area would follow alongside existing linear ROWs that produce continual disturbance to the area. The 100-foot temporary construction easement boundary would be staked and flagged within the line of sight by the contractor.

Western burrowing owl. The Proposed Action would have no direct effects on individual burrowing owls. No active burrows were located in the areas of proposed construction during environmental surveys of the proposed ROW. The Proposed Action may have an indirect effect on nearby burrowing owls during construction activities. Any potential impact would be minimal, lasting only during the construction activities within the ROW. A clearance survey for burrowing owls of proposed project areas would be conducted within 30 days prior to initiation of construction activities. If burrowing owls are found, the owls would be evicted prior to the start of construction. If eviction of owls during the breeding season is necessary, the project proponent would coordinate with the USFWS and AGFD/NMDGF to evict the owls in a manner that minimizes potential harm to adults and nestlings.

Jaguar. The Proposed Action would have no direct effects on individual jaguars. The Proposed Action may have an indirect effect on foraging behavior of jaguars by displacing prey species during construction. The potential for jaguars roaming as far north as the project site is extremely low.

Lesser long-nosed bat—The Proposed Action would have no direct effects on individual lesser long-nosed bats. Saguaros, which are major foraging plants, would not be removed, and would remain physically available to the bats. The Proposed Action may have an indirect effect on foraging behavior of individuals potentially foraging in the area during the period in which construction activities take place. This potential impact would be minimal considering the amount of foraging area and suitable vegetation surrounding the proposed project area. Additionally, the proposed project area would follow alongside existing linear ROWs that produce continual disturbance to the area.

Cave myotis. The Proposed Action would have no direct effects on individual cave myotis. The Proposed Action may have an indirect effect on foraging behavior of individuals potentially foraging in the area during the period in which construction activities take place. This potential impact would be minimal considering the amount of foraging area and suitable vegetation surrounding the proposed project area. Additionally, the proposed project area would follow alongside existing linear ROWs that produce continual disturbance to the area.

Fringed myotis. The Proposed Action would have no direct effects on individual fringed myotis. The Proposed Action may have an indirect effect on foraging behavior of individuals potentially foraging in the area during the period in which construction activities take place. This potential impact would be minimal considering the amount of foraging area and suitable vegetation surrounding the proposed project area. Additionally, the proposed project area would follow alongside existing linear ROWs that produce continual disturbance to the area.

Mexican long-nosed bat. The Proposed Action would have no direct effects on individual Mexican long-nosed bats. The Proposed Action may have an indirect effect on foraging behavior of individuals potentially foraging in the area during the period in which construction activities take place. This potential impact would be minimal considering the amount of foraging area and suitable vegetation surrounding the proposed project area. Additionally, the proposed project area would follow alongside existing linear ROWs that produce continual disturbance to the area.

Mexican long-tongued bat. The Proposed Action would have no direct effects on individual Mexican long-tongued bats. Saguaros, which are major foraging plants, would not be removed, and would remain physically available to the bats. The Proposed Action may have an indirect effect on foraging behavior of individuals potentially foraging in the area during the period in which construction activities take place. This potential impact would be minimal considering the amount of foraging area and suitable vegetation surrounding the proposed project area. Additionally, the proposed project area would follow alongside existing linear ROWs that produce continual disturbance to the area.

Western small-footed myotis. The Proposed Action would have no direct effects on individual western small-footed myotis. The Proposed Action may have an indirect effect on foraging behavior of individuals potentially foraging in the area during the period in which construction activities take place. This potential impact would be minimal considering the amount of foraging area and suitable vegetation surrounding the proposed project area. Additionally, the proposed project area would follow alongside existing linear ROWs that produce continual disturbance to the area.

Desert tortoise. The Proposed Action would have no direct effects on individual desert tortoises. However, if a tortoise is encountered in the project area, work in the area would cease until the tortoise could be moved out of harms way by a qualified handler. The Proposed Action may have an indirect effect on foraging behavior of individuals potentially foraging or roaming in the area during the period in which construction activities take place. This potential impact would be minimal considering the amount of foraging area and suitable vegetation surrounding the proposed project area. Additionally, the proposed project area would follow alongside existing linear ROWs that produce continual disturbance to the area.

Texas horned lizard. The Proposed Action would have no direct effects on individual Texas horned lizards. The Proposed Action may have an indirect effect on individuals by impacting potential habitat within the ROW. This potential impact would be minimal considering the amount of potential habitat surrounding the proposed project area.

Sand prickly-pear cactus. The Proposed Action would have no direct effects on individual sand prickly-pear cacti. The Proposed Action may have a direct effect on potential habitat for this species within the ROW. This potential impact would be minimal considering the amount of potential habitat surrounding the proposed project area. Additionally, the proposed project area would follow alongside existing linear ROWs that produce continual disturbance to the area.

Segment 3. The Proposed Action would have the following environmental consequences in Segment 3:

Cactus ferruginous pygmy-owl. The Proposed Action would have no direct effect on individual CFPOs but may have a direct effect on potentially suitable breeding and dispersal habitat in the form of construction activities. However, this effect would be minimal and take place for the short amount of time it takes to install the new pipeline in this segment. To minimize any potential effects, large mesquites and saguaros within potential breeding or disperal habitat would be avoided to the extent practicable (see W2 of Table 2.3-1). Plants to be avoided would be flagged prior to construction. Upon installation of the new pipeline segment, the ROW would be restored to its original contour. Disturbances due to I-10 and UPRR would continue to occur along the segment of the proposed project. Indirectly, construction activities may potentially affect the dispersal activities of individuals. This potential effect also would be minimal considering the proposed project would follow alongside existing linear ROWs that produce continual disturbance to the area.

Western burrowing owl. The Proposed Action would have no direct effects on individual burrowing owls. No active burrows were located in the areas of proposed construction during environmental surveys of the proposed ROW. The Proposed Action may have an indirect effect on nearby burrowing owls during construction activities. Any potential impact would be minimal, lasting only during the construction activities within the ROW. A clearance survey for burrowing owls of proposed project areas would be conducted within 30 days prior to initiation of construction activities. If burrowing owls are found, the owls would be evicted prior to the start of construction. If eviction of owls during the breeding season is necessary, the project proponent would coordinate with the USFWS and AGFD to evict the owls in a manner that minimizes potential harm to adults and nestlings.

Lesser long-nosed bat. The Proposed Action would have no direct effects on individual lesser long-nosed bats. Saguaros, which are major foraging plants, would not be removed, and would remain physically available to the bats. The Proposed Action may have an indirect effect on foraging behavior of individuals potentially foraging in the area during the period in which construction activities take place. This potential impact would be minimal considering the amount of foraging area and suitable vegetation surrounding the proposed project area. Additionally, the proposed project area would follow alongside existing linear ROWs that produce continual disturbance to the area.

Cave myotis. The Proposed Action would have no direct effects on individual cave myotis. The Proposed Action may have an indirect effect on foraging behavior of individuals potentially foraging in the area during the period in which construction activities take place. This potential impact would be minimal considering the amount of foraging area and suitable vegetation surrounding the proposed project area. Additionally, the proposed project area would follow alongside existing linear ROWs that produce continual disturbance to the area. The species insect prey base would be unaffected.

California leaf-nosed bat. The Proposed Action would have no direct effects on individual California leaf-nosed bats. The Proposed Action may have an indirect effect on foraging behavior of individuals potentially foraging in the area during the period in which construction activities take place. This potential impact would be minimal considering the amount of foraging area and suitable vegetation surrounding the proposed project area. Additionally, the proposed project area would follow alongside existing linear ROWs that produce continual disturbance to the area. The species insect prey base would be unaffected.

Desert tortoise. The Proposed Action would have no direct effects on individual desert tortoises. However, if a tortoise is encountered in the project area, work in the area would cease until the tortoise could be moved out of harms way by a qualified handler. The Proposed Action may have an indirect effect on foraging behavior of individuals potentially foraging or roaming in the area during the period in which construction activities take place. This potential impact would be minimal considering the amount of foraging area and suitable vegetation surrounding the proposed project area. Additionally, the proposed project area would follow alongside existing linear ROWs that produce continual disturbance to the area.

Acuna cactus. The Proposed Action would have no direct effects on individual acuna cacti. The Proposed Action may have a direct effect on potential habitat for this species within the ROW. This potential impact would be minimal considering the amount of potential habitat surrounding the proposed project area. Additionally, the proposed project area would follow alongside existing linear ROWs that produce continual disturbance to the area.

Segment 4. The Proposed Action would have the following environmental consequences in Segment 4:

Western burrowing owl. The Proposed Action would have no direct effects on individual burrowing owls. No active burrows were located in the areas of proposed construction during environmental surveys of the proposed ROW. The Proposed Action may have an indirect effect on nearby burrowing owls during construction activities. Any potential impact would be minimal, lasting only during the construction activities within the ROW. A clearance survey for burrowing owls of proposed project areas would be conducted within 30 days prior to initiation of construction activities. If burrowing owls are found, the owls would be evicted prior to the start of construction. If eviction of owls during the breeding season is necessary, the project proponent would coordinate with the USFWS and AGFD to evict the owls in a manner that minimizes potential harm to adults and nestlings.

Acuna cactus. The Proposed Action would have no direct effects on individual acuna cacti. The Proposed Action may have a direct effect on potential habitat for this species within the ROW. This potential impact would be minimal considering the amount of potential habitat surrounding the proposed project area. Additionally, the proposed project area would follow alongside existing linear ROWs that produce continual disturbance to the area.

No Action Alternative. Under the No Action Alternative, no ground disturbing activities would occur and habitat within the proposed project areas would remain in their current state. The No Action Alternative would have no immediate affect on special status species. No mitigation would be required. However, continued aging of the existing pipeline could lead to increased maintenance activities. Such activities could be in emergency situations, which could lead to unforeseen impacts to special status species.

3.9 Air Quality

The U.S. Environmental Protection Agency (USEPA) sets air quality standards as a mechanism for attaining air quality levels that protect public health and the environment. These standards are based on scientific determinations of thresholds below which no adverse effects on human health or the environment may occur. The current National Ambient Air Quality Standards (NAAQS) have been established for six criteria pollutants: carbon monoxide, nitrogen dioxide, lead, ozone, sulfur dioxide, and two sizes of particulate matter (PM). States are required to adopt ambient air quality standards that are at least as stringent as the federal NAAQS; however, state standards may be more stringent. Areas of the country where air pollution levels consistently exceed the NAAQS may be designated "nonattainment." The following section provides the nonattainment area specifications for Segments 1 through 4.

3.9.1 Affected Environment

3.9.1.1 Segment 1

Segment 1 is located entirely in El Paso County in the State of Texas. El Paso County is designated as nonattainment for ozone and PM_{10}. Portions of the county also are designated nonattainment for carbon monoxide. El Paso County is designated attainment for all other pollutants by USEPA and the State of Texas. Segment 1 would be located in the nonattainment area for PM_{10} and ozone. After June 15, 2005, when 1-hour ozone standard is replaced by an 8-hour standard, El Paso would be redesignated attainment for the 8-hour ozone standard.

3.9.1.2 Segment 2

Segment 2 is located in Dona Ana, Luna, Grant, and Hidalgo counties in New Mexico and Cochise County in Arizona.

Portions of Dona Ana County are designated nonattainment for PM_{10} and ozone. Luna County is designated attainment for all criteria pollutants. A portion of Grant County is designated nonattainment for sulfur dioxide in the vicinity of Phelps Dodge Chino Copper Smelter. The Grant County nonattainment area is a portion of an 8-mile radius region around the smelter. Hidalgo County is designated attainment for all criteria pollutants.

Portions of Cochise County in Arizona are designated nonattainment for PM_{10} and sulfur dioxide. The primary source for the sulfur dioxide was the Phelps Dodge, Inc. copper smelter, which was dismantled in 1995. In December 2001, the Arizona Department of Environmental Quality (ADEQ) submitted to USEPA the *Douglas Sulfur Dioxide Nonattainment Area State Implementation and Maintenance Plan and Request for Redesignation to Attainment*. The area in which the proposed pipeline would be located is designated as attainment for all criteria pollutants.

3.9.1.3 Segment 3

Segment 3 passes through Pima and Pinal Counties, Arizona; however, most of the segment is located in Pinal County.

Portions of Pima County are designated nonattainment for PM_{10} and sulfur dioxide. Portions of Pinal County are designated nonattainment for $PM_{10,}$ sulfur dioxide, and ozone. Portions of Segment 3 would be located in nonattainment area for PM_{10} in Pima County. Segment 3 in Pinal County is located in attainment areas for all pollutants.

3.9.1.4 Segment 4

Segment 4 is located in both Pinal and Maricopa counties. As mentioned above, Pinal County is nonattainment for $PM_{10,}$ sulfur dioxide, and ozone, while Maricopa County is nonattainment for carbon monoxide, PM_{10}, and ozone. Segment 4 in Pinal County is located in an attainment area for all pollutants. Segment 4 also passes through GRIC. GRIC is attainment or unclassifiable for all criteria pollutants.

3.9.1.5 Ancillary Facilities

The breakout terminal and pump station (El Paso Breakout Station) in El Paso County would be located in the City of El Paso near the intersection of Railroad Drive and Ashley Road. The key elements of the proposed project include installation of

- Two 80,000-barrel multi-product (gasoline, diesel, or jet) storage tanks
- Six 50,000-barrel multi-product (gasoline, diesel, or jet) storage tanks
- One 30,000-barrel transmix storage tank
- Scraper pig launching and receiving facility
- Electrically driven shipping pumps
- Vapor bladder tank and thermal oxidizer

SFPP is applying to the Texas Commission on Environmental Quality (TCEQ) for an air quality permit as required by the Texas Administrative Code Chapter 116 (30 TAC Chapter 116). The El Paso Breakout Station would be developed on approximately 35 acres of currently undeveloped property. There is no school within 3,000 feet of the property and no developed housing within 50 feet of the property. The nearest school to the proposed site is Desertaire Elementary School at 6301 Tyger Eye Drive, approximately 10,500 feet from the property. The nearest housing to the proposed site is on Roadrunner Street, located approximately 5,870 feet to the southwest of the proposed site.

3.9.2 Environmental Consequences

3.9.2.1 Proposed Action

The proposed project is located in a Class II airshed. Under the Clean Air Act (CAA), Class II areas have increment ceilings on additional pollution over baseline concentrations, which allow for moderate development. Class II airsheds represent areas of the country protected under the CAA, however, with less stringent protection from air pollution damage than Class I or other exceptions. Class I airsheds are identified by the CAA as areas that were in existence as of August 7, 1977, that meet the following criteria: national parks over 6,000 acres, national wilderness areas and national memorial parks over 5,000 acres, and international parks.

Air quality for the entire project area would be degraded only during short-term construction activities and during limited operation of backup generators at ancillary facilities. During groundbreaking activities for pipe installation, an increase in vehicular traffic and fugitive dust would be expected. An increase in emissions from construction equipment and vehicles transporting employees and materials to the work site also would occur during the construction phase. However, emission levels of volatile organic compounds (VOCs), nitrogen oxides, sulfur dioxide, carbon monoxide, and other emissions from internal combustion engines and PM_{10} from vehicular travel on unpaved surfaces would not be expected to exceed any predetermined standards for air quality (BLM, 2001).

In the maintenance phase, little impact on air quality from fugitive dust is anticipated due to the close proximity of the ROW to existing highways, requiring minimal travel on unpaved surfaces. The pump stations would not affect air quality under normal conditions. In the event of regular power interruptions, backup generators (255 horsepower [hp]) powered by natural gas or diesel fuel would provide emergency electrical power. It is estimated that each generator would not be required for more than 100 hours per year. During times of operation, these generators would emit some amounts of the six criteria pollutants; however, emissions would not exceed annual air quality general conformity thresholds (BLM, 2001). No mitigation measures for generator use are recommended as no adverse effects would result from their temporary use.

The following mitigation measures would be in place during project construction and/or operation of the pipeline system:

- Construction sites would be sprayed with water, when needed, to reduce suspension of dust particles.
- All portable engines and portable engine-driven equipment would be inspected and maintained pursuant to state or local regulations.

Impacts to air quality for each segment would be negligible and short term. Impacts would primarily take the form of fugitive dust during construction activities. The Proposed Action would not cause the local air quality to exceed the NAAQS.

No Action Alternative. Under the No Action Alternative, the current supply of petroleum products would have to satisfy the increasing demands of the Phoenix/Tucson region. The area would continue to receive a large portion of their petroleum products via tanker trucks. Potential environmental impacts associated with hauling petroleum products by tanker trucks would remain. This would include potential impacts to air quality due to high truck traffic associated with tanker trucks hauling to Phoenix and Tucson.

3.10 Historic and Cultural Resources

Cultural resources are locations of past activity, occupation or use, and include archaeological, historic, or architectural sites. A cultural resource is defined as 50 years old or older. Numerous laws and regulations oversee the protection of such cultural resources, including the Antiquities Act of 1906 (PL 59-206), the National Historic Preservation Act of 1966 (as amended, PL 89-665), the National Environmental Policy Act of 1969 (PL 91-852), the Archaeological Resources Protection Act of 1979 (PL 96-95), and the Executive Order 11593.

A Class I archaeological site records search was conducted to gather information on previously recorded sites within a ¼-mile radius of the project area in Texas and New Mexico and 1-mile radius in Arizona. Subsequently, a Class III intensive field inventory was conducted within a 200-foot-wide corridor for the pipeline and access roads. Laydown yards and break down areas also were surveyed. Archaeologists walked non-overlapping transects spaced at no more than 15-meter intervals. Any cultural remains determined to be 50 years or older were recorded. If an area contained a concentration of artifacts or features, the area was recorded as a site according to BLM, Fort Bliss, and the States of Texas, New Mexico, and Arizona’s definitions for sites located within their respective jurisdictions. If these definitions did not apply to the located cultural remains, they were recorded as isolated occurrences. During recording of a site, archaeologists analyzed artifacts in the field to determine the age of the site and its cultural affiliation. In addition, National Register of Historic Places (NRHP) eligibility also was assessed for each site.

The goals of the survey were (1) to identify all cultural resources within the area potential effect, (2) to evaluate such resources in terms of eligibility for the National and State Registers of Historic Places (collectively referred to as the Register), and (3) to assess the effects of the proposed undertaking on such resources. Historic context, historic significance, and historic integrity are the three interrelated concepts on which eligibility is based. ("Historic", in this sense, applies to both prehistoric and historic-period cultural resources.) The significance of a cultural resource (historic property) depends upon its association with an important historic context and upon retaining the integrity of those features necessary to convey its significance.

- Historic contexts are defined as "those patterns, themes, or trends in history by which a specific occurrence or property is understood and its meaning (and ultimately its significance) within history is made clear" (National Register Staff, 1998:7). For archaeological sites, the historic context is "the analytical framework within which a property's importance can be understood" (Townsend et al., 1993:25).
- Historic significance is defined as "the importance of a property to the history, architecture, archaeology, engineering, or culture of a community, state, or the nation" (McClelland, 1997:3). The criteria used to determine significance recognize different types of values embodied in the various types of cultural resources: districts, sites, buildings, structures, and objects. These values fall into one or more categories (National Register Staff, 1998:11):
  - Associative value (Criteria A and B): Cultural resources significant for their association or linkage to events (Criterion A) or persons (Criterion B) important in the past.
  - Design or Construction value (Criterion C): Cultural resources significant as representatives of the manmade expression of culture or technology.
  - Information value (Criterion D): Cultural resources significant for their ability to yield important information about prehistory or history.
- Historic integrity is defined in general as "the authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic period (McClelland, 1997:4). For archaeological sites significant under Criterion D, the site's importance resides in its potential to answer questions relevant to its historic context. This, in turn, means that its historic integrity is defined by the presence of sufficiently intact archaeological features and deposits (Townsend et al., 1993).

The project archaeologists made NRHP eligibility recommendations to the BLM; the BLM then consulted with the appropriate agencies to determine site eligibility.

3.10.1 Affected Environment

Since the current project crosses a vast extent of the southern Southwest, the project area includes evidence of many cultures. Archaeologists have devised various frameworks to address culture history in the region. Evidence of human occupation in the region where the pipeline segments cross are evident since the Paleoindian period of 10,000 B.C. There are similarities across the region in the Paleoindian and Archaic period, but later prehistory exhibits greater variability. It is therefore necessary to discuss the Archaic and later periods in a more detailed way for the sub-regions of this project. A complete Chronologic Cultural History can be found at the end of this document in Appendix H.

3.10.2 Segment 1

Segment 1 cultural resources surveys conducted in and within ¼ mile of project area are listed in Table 3.10-1. Table 3.10-2 lists the previously located sites within the same area.

TABLE 3.10-1
Segment 1 Cultural Resources Surveys Conducted In and Within ¼ Mile of Project Area

Year	No. of Acres/Miles	Client/Sponsor	Undertaking	Performing Agency/ Consultant	Reference
Segment 1					
1964	Unknown	Unknown	Survey	U.T. Austin	U.T. Austin 1964
1967	Unknown	Unknown	Salvage Project	EPAS	Brook, 1967
1976	Unknown	Ft. Bliss	Maneuver Areas 1 and 2	UTEP	Whalen, 1976
1977	Unknown	Ft. Bliss	Maneuver Areas 1 and 2	UTEP	Whalen, 1977
1978	Unknown	Ft. Bliss	Maneuver Areas 1 and 2	UTEP	Whalen, 1978
1980	Unknown	Ft. Bliss	Maneuver Areas 1 and 2	UTEP	Whalen, 1980
1986	Unknown	TXDOT	Loop 375	UTEP	O'Laughlin et al., 1986
1987	Unknown	TXDOT	Loop 375	UTEP	O'Laughlin et al., 1987
1988	Unknown	TXDOT	Loop 375	UTEP	O'Laughlin et al., 1988
1989	Unknown	TXDOT	Loop 375	UTEP	O'Laughlin et al., 1989
1990	Unknown	TXDOT	Loop 375	UTEP	O'Laughlin et al., 1990
1991	Unknown	TXDOT	Loop 375	UTEP	O'Laughlin et al., 1991
1996	Unknown	Ft. Bliss	Maneuver Areas 1 and 2		Lukowski and Stuart 1996

Notes:
EPAS = El Paso Archaeological Society
U.T. Austin = University of Texas, Austin
UTEP = University of Texas, El Paso
TXDOT = Texas Department of Transportation

TABLE 3.10-2
Segment 1 Previously Recorded Sites in and Within ¼ Mile of Project Area

Site No.	Site Type/Constituents	Cultural/Temporal Affiliation(s)	Reference
Segment 1			
41EP8 (FB 10366)	Habitation	Mogollon	U.T. Austin, 1964
41EP12 (FB 10537)	Habitation	Mogollon	Brook, 1967
41EP319	Artifact scatter	Mogollon	Unknown
41EP898	Small camp	Unknown	Whalen, 1977
41EP902 (FB 7884)	Artifact scatter with feature	Unknown	Unknown
41EP993	Not in TARL database	Not in TARL database	Unknown
41EP994	Small camp	Unknown	Whalen, 1977
41EP995	Not in TARL database	Not in TARL database	Unknown
41EP1591	Small camp	Unknown	Whalen, 1977
41EP1634	Small camp	Unknown	Whalen, 1977
41EP1635	Small camp	Unknown	Whalen, 1977
41EP1672 (FB 6832)	Artifact scatter with features	Mogollon	Unknown
41EP1689	Habitation	Mogollon	Unknown
41EP1713	Habitation	Mogollon	Unknown
41EP1714	Not in TARL database	Not in TARL database	Unknown
41EP1716	Artifact scatter	Mogollon	EPAS, 1985
41EP1717	Small camp	Unknown	Whalen, 1977
41EP1870	Not in TARL database	Not in TARL database	Unknown
41EP1887	Habitation	Mogollon	Unknown
41EP1897	Not in TARL database	Not in TARL database	O’Laughlin et al., 1988
41EP1898	Habitation	Mogollon	O’Laughlin et al., 1988
41EP1900	Not in TARL database	Not in TARL database	Unknown
41EP1902	Habitation	Mogollon	Unknown
41EP2502	Not in TARL database	Not in TARL database	Unknown
41EP2704	Artifact scatter with hearth	Unknown	O’Laughlin et al., 1988
41EP2705	Artifact scatter	Mogollon	O’Laughlin et al., 1988
41EP2706	Artifact scatter with hearth	Archaic/Mogollon	O’Laughlin et al., 1991
41EP2707	Artifact scatter with hearth	Mogollon	O’Laughlin et al., 1988
41EP2708	Artifact scatter with hearth	Unknown	O’Laughlin et al., 1988

TABLE 3.10-2 (CONTINUED)
Segment 1 Previously Recorded Sites in and Within ¼ Mile of Project Area

Site No.	Site Type/Constituents	Cultural/Temporal Affiliation(s)	Reference
41EP2812	Artifact scatter with hearth	Archaic/Mogollon	O'Laughlin et al., 1988
41EP2838 (FB 10038)	Artifact scatter with features	Mogollon	O'Laughlin et al., 1989
41EP4999	Artifact scatter	Unknown	Lukowski and Stuart 1996
41EP5006	Artifact scatter	Unknown	Lukowski and Stuart 1996
FB 11423	Artifact scatter with hearth	Unknown	Unknown
FB 11428	Artifact scatter with hearth	Unknown	O'Laughlin et al., 1990
FB 12147	Lithic scatter	Unknown	O'Laughlin et al., 1990
FB 12155	Artifact scatter	Unknown	O'Laughlin et al., 1990
FB 12332	Artifact scatter	Unknown	Unknown
FB 12334	Artifact scatter	Unknown	Unknown
FB 12347	Artifact scatter with hearth	Unknown	Unknown
FB 12353	Artifact scatter	Archaic/Mogollon	Unknown

Archeological sites located within the project corridor for Segment 1 are listed in the following table for both previously recorded and currently recorded sites that may be impacted by the proposed action. Seven sites occur in Texas, four of which are recommended as NRHP eligible. Treatment recommendations are indicated in Table 3.10-3 for each site. Data recovery would be limited to the areas of potential effect. A monitor will be provided for all ground disturbing activities near and within the boundaries of sites determined eligible for the NRHP and for other areas determined to have a high potential for buried cultural deposits.

TABLE 3.10-3
Segment 1 Archaeological Sites in Texas: NRHP Eligibility and Treatment Recommendations

Site No.	Cultural/ Temporal Affiliation	Site Type	Eligibility	Approx. Size	Reason for Eligibility	Avoidance Option	Treatment
41EP? (FB 12353)	Archaic/ Jornada Mogollon	Artifact scatter	Eligible	6775 m^2	Subsurface cultural remains	Narrow south side to avoid	Trench site west boundary (site is just inside the ROW)
41EP12 (FB 10537)	Jornada Mogollon	Habitation	Not eligible				No longer exists
41EP902 (FB 7884)	Unknown	Artifact scatter with feature	Not eligible	Now only six flakes, and one ground stone			None
41EP1672 (FB 6832)	Jornada Mogollon	Artifact scatter with features	Eligible	17,777 m^2	Subsurface stains	No	Data recovery-three of the five features within ROW
41EP2838 (FB 10038)	Jornada Mogollon	Artifact scatter with features	Eligible	307 m^2	Subsurface stains	Narrow south side to avoid	Data recovery-site mostly in ROW
41EP? (FB 12147)	Unknown	Lithic scatter	Not eligible	Now only one flake			None
41EP1905 (FB 7954)	Jornada Mogollon	Artifact scatter	Not eligible		No surface cultural remains found within project area		None
41EP4998	Jornada Mogollon	Artifact scatter	Not eligible		No surface cultural remains found within project area		None
41EP5004	Jornada Mogollon	Artifact scatter	Not eligible		No surface cultural remains found within project area		None
41EP5005	Jornada Mogollon	Artifact scatter with features	Eligible		No surface cultural remains found within project area		None
41EP2503		Artifact scatter	Not eligible		No surface cultural remains found within project area		None
41EP8 (FB 10366)	Jornada Mogollon	Habitation	Eligible		Roomblock site but break down station misses most	Avoided by relocation of breakout facility	None

Note: m^2 = square meter.

3.10.3 Segment 2

3.10.3.1 Segment 2 (New Mexico Portion)

Segment 2 cultural resources surveys conducted in the New Mexico portion within ¼ mile of project area are listed in Table 3.10-4. Table 3.10-5 lists the previously located sites within the same area.

TABLE 3.10-4
Segment 2 Cultural Resources Surveys Conducted In and Within ¼ Mile of Project Area (New Mexico Portion)

Year	No. of Acres/Miles	Client/Sponsor	Undertaking	Performing Agency/ Consultant	Reference
Segment 2 (New Mexico Portion)					
1964	N/A	NMDOT	Highway cultural inventory	NM Office of Cultural Affairs	Alexander, 1964
1981	407 miles	Arma Geophysical	Transect sampling	NMSU	Hilley, 1981
1982	3236	Grant Geophysical	Seismic	NMSU	Duran, 1982
1985	77.27	El Paso Electric Company	El Paso Electric Company Luna to Newman transmission line	John Wilson	Wilson, 1985
1985	43.73	Western New Mexico Phone Co	Telephone cable along Animas Road	U.T.-Austin	Mallouf, 1985
1983	39	NMDOT	Lordsburg rest area on I-10	NMDOT	Koczan, 1983
1979	236.36	Western Geophysical	Seismic	ENMU	MacLennan et al., 1979
1978	487.24	Exxon	Seismic Lines	NMSU	Weyer, 1978
1980	4799.25	Petty-Ray Geophysical	Geophysical testing transects	NMSU	Taylor, et al., 1980
1977	Unknown	El Paso Electric Company	345-kV line from Deming to El Paso	NMSU	Brethauer, 1977
1986	33.3	Western New Mexico Phone Co	Buried telephone cable, SW of Road Forks	Archeological Research	Nightengale, 1986
1987	403	NMDOT	I-10 east of Gage	NMDOT	Nelson, 1987
1986	2080	US Telecom	Preliminary report, fiber optic cable	Human Systems Research	Kirkpatrick and Hart, 1986
1987	127.3	NMDOT	I-10 in Deming	NMDOT	Nelson, 1987
1980	484.84	PNM	Luna to Central 115-kV line, PNM	PNM	Stein et al., 1980
1989	Unknown	BLM	All-American pipeline	NMSU	Ackerly et al., 1989

TABLE 3.10-4 (CONTINUED)
Segment 2 Cultural Resources Surveys Conducted In and Within ¼ Mile of Project Area (New Mexico Portion)

Year	No. of Acres/Miles	Client/Sponsor	Undertaking	Performing Agency/ Consultant	Reference
1987	326.6	NMDOT	Cultural resource survey, I-10, MP 85.3 to 93, New Mexico	NMDOT	Nelson, 1987
1980	10,829	Geosources, Inc.	Nine hydrocarbon testing transects	NMSU	Heinsch, 1980
1992	2.78	Santa Fe pipeline	Anode site and corridor	Batcho & Kauffman Associates	Kauffman, 1992
1992	91.75	Utility Department	Afton-Mesilla pipeline	NMSU	Ackerly et al., 1992
1993	10	Lordsburg Mine District	Virginia subdistrict, Lordsburg mine district	NM Energy, Minerals, & Natl. Res. Dept	Swick, 1993
1994	11.82	El Paso Electric Company	Afton powerline extension	Batcho & Kauffman Associates	Stuart, 1994
1955	Unknown	Southern Pacific Pipeline Company	Southern Pacific pipeline	NPS	Ingmanson, 1955
1995	N/A	EcoPlan Associates, Inc.	Monitoring, Santa Fe Pacific pipeline	Soil Systems	Owens, 1995
1995	418.18	NMDOT	East bound I-10, Grant county	NMDOT	Evans, 1995
1995	25.51	Engineers, Inc.	Waterline for Lordsburg	Archaeological Services by Laura Michalik	Michalik, 1995
1995	Unknown	NM Office of Cultural Affairs MNM-Laboratory of Anthropology	Pacific-Texas pipeline	Prewitt & Associates	Boyd, 1995
1996	93.1	Southwestern Field Biologists	Santa Fe pipeline, survey and monitoring, between Steins and Separ	Human Systems Research	Mendez and Knight, 1996
1997	Unknown	Myra L. Franks & Associates	Nineteen Southern Pacific railroad segments	Ecology and Environment, Inc.	Ecology and Environment, Inc., 1997
1996	N/A	US Army Fort Bliss	Chronometric and relative chronology project	UTEP	Miller, 1996

TABLE 3.10-4 (CONTINUED)
Segment 2 Cultural Resources Surveys Conducted In and Within ¼ Mile of Project Area (New Mexico Portion)

Year	No. of Acres/Miles	Client/Sponsor	Undertaking	Performing Agency/ Consultant	Reference
1999	158.79	Engineers, Inc.	Landfill, Lordsburg	Archaeological Services by Laura Michalik	Michalik, 1999
1999	2084.8	Jones & Stokes, Inc.	Union Pacific Railroad	Geo-Marine	Slaughter and Gibbs, 1999
2000	2615	El Paso Energy Communications Company	El Paso to Los Angles Fiber Optic Cable, New Mexico	SWCA.	Wase et al. 2000
2000	802.8	PF.Net Construction Corporation	AT&T Nex/Gen Core Project, New Mexico	WCRM	Kearns et al. 2000
2001	4416	World Wide Inc.	360 networks fiber optics, NM and AZ	TRC	Railey and Yost, 2001
2001	9	PF. Net	ATT Nexgen/Core addendum	WCRM	Not submitted
2002	280	Duke Engineering & Services	Water pipeline for energy facility	Human Systems Research	Russell, 2002
2002	N/A	PF Net/AT&T	Testing ATT fiber line	WCRM	Not submitted
2002	6.2	Johnny's Septic Service	Septic service	Don Clifton	Not submitted
2002	125.8	Trigon-Sheehan Engineers	Duke Energy pipeline	La Plata	Fuller, 2002
2003	320	City of Deming	Landfill, Deming	Archaeological Services by Laura Michalik	Not submitted

Notes:
ENMU = Eastern New Mexico University
NMDOT = New Mexico Department of Transportation
NMSU = New Mexico State University
WCRM = Western Cultural Resources Management

TABLE 3.10-5
Segment 2 Previously Recorded Sites in and Within ¼ Mile of Project Area (New Mexico Portion)

Site No.	Site Type/Constituents	Cultural/Temporal Affiliation(s)	Reference
Segment 2 (New Mexico Portion)			
LA 3338PL	Artifact scatter	Mogollon	Alexander, 1964
LA 5171	Town of Separ	Anglo/Euroamerican	Kirkpatrick and Hart, 1986
LA 5594PL	Artifact scatter	Unknown	Unknown
LA 5756PL	Artifact scatter	Unknown	Alexander, 1964
LA 5951	Artifact scatter	Mogollon	Ackerly et al., 1989
LA 5952PL	Artifact scatter with mounds	Mogollon	Ingmanson, 1955
LA 5953PL	Artifact scatter with mounds	Mogollon	Ingmanson, 1955
LA 5954PL	Artifact scatter with mounds	Mogollon	Ingmanson, 1955
LA 15327PL	Artifact scatter	Unknown	Brethauer, 1977
LA 15328	Artifact scatter with hearths	Mogollon	Brethauer, 1977
LA 15329	Artifact scatter	Unknown/Anglo/Euroamerican	Brethauer, 1977
LA 15330	Artifact scatter	Archaic/Mogollon	Hilley, 1981
LA 16467	Artifact scatter with hearths	Mogollon	Weyer, 1978
LA 16468	Artifact scatter with hearths	Paleoindian/Mogollon	Ackerly et al., 1989
LA 16469	Artifact scatter	Unknown	Miller, 1996
LA 16470	Artifact scatter	Mogollon	Ackerly et al., 1989
LA 16471	Artifact scatter	Mogollon	Unknown
LA 20032	Artifact scatter with hearths	Unknown	MacLennan et al., 1979
LA 20033	Artifact scatter with hearths	Unknown	MacLennan et al., 1979
LA 21704	Artifact scatter	Unknown	Stein et al., 1980
LA 26972	Artifact scatter	Archaic/Mogollon	Heinsch, 1980
LA 27738	Artifact scatter with hearths	Mogollon	Taylor, et al., 1980
LA 27789	Dump	Unknown	Taylor, et al., 1980
LA 35175PL	Artifact scatter with hearths	Archaic/Mogollon	Hilley, 1981
LA 35176	Artifact scatter with hearths	Mogollon	Hilley, 1981
LA 35177	Artifact scatter	Mogollon	Hilley, 1981
LA 35178	Artifact scatter	Unknown	Hilley, 1981
LA 35244	Artifact scatter with hearths	Archaic/MogollonAnglo/ Euroamerican	Hilley, 1981

TABLE 3.10-5 (CONTINUED)
Segment 2 Previously Recorded Sites in and Within ¼ Mile of Project Area (New Mexico Portion)

Site No.	Site Type/Constituents	Cultural/Temporal Affiliation(s)	Reference
LA 35326	Artifact scatter/road/trail	Unknown	Duran, 1982
LA 45402	Artifact scatter/mining features	Mogollon/Anglo/Euroamerican	Koczan, 1983
LA 50129	Habitation	Hispanic	Mallouf, 1985
LA 51111PL	Artifact scatter	Archaic	Wilson, 1985
LA 53839	Habitation	Anglo/Euroamerican	Nelson, 1987
LA 54815	Town of Lisbon dump	Anglo/Euroamerican	Kirkpatrick and Hart, 1986
LA 54926	Artifact scatter	Anglo/Euroamerican	Nightengale, 1986
LA 55765	Artifact scatter	Unknown	Ackerly et al., 1989
LA 55782	Artifact scatter	Unknown	Ackerly et al., 1989
LA 55785	Artifact scatter with hearths	Archaic/Mogollon	Ackerly et al., 1989
LA 55787	Artifact scatter with midden	Unknown	Ackerly et al., 1989
LA 56186	Artifact scatter	Unknown	Unknown
LA 58972	Gage	Anglo/Euroamerican	Nelson, 1987
LA 65456	Habitation	Anglo/Euroamerican	Nelson, 1987
LA 66082	Artifact scatter	Mogollon	Boyd, 1995
LA 66083	Artifact scatter with hearths	Unknown/Mogollon	Boyd, 1995
LA 66088	Artifact scatter with hearths	Mogollon	Stuart, 1994
LA 66084	Artifact scatter	Unknown	Boyd, 1995
LA 66085	Artifact scatter	Unknown	Boyd, 1995
LA 66087	Artifact scatter with hearths	Unknown	Boyd, 1995
LA 66089	Artifact scatter	Archaic/Mogollon	Boyd, 1995
LA 66090	Artifact scatter	Mogollon	Boyd, 1995
LA 66091	Artifact scatter	Unknown	Boyd, 1995
LA 66092	Artifact scatter	Unknown	Boyd, 1995
LA 66093	Artifact scatter	Unknown	Boyd, 1995
LA 66103	Artifact scatter	Archaic/Mogollon/Apache	Boyd, 1995
LA 98662	Artifact scatter with hearth	Mogollon	Ackerly et al., 1992
LA 98663	Artifact scatter	Anglo/Euroamerican	Ackerly et al., 1992
LA 99722	Artifact scatter with hearth	Mogollon	Kauffman, 1992

TABLE 3.10-5 (CONTINUED)
Segment 2 Previously Recorded Sites in and Within ¼ Mile of Project Area (New Mexico Portion)

Site No.	Site Type/Constituents	Cultural/Temporal Affiliation(s)	Reference
LA 99986/ 140121	Mining	Anglo/Euroamerican	Swick, 1993
LA 108656	Artifact scatter	Unknown	Owens, 1995
LA 108657	Artifact scatter	Unknown	Owens, 1995
LA 108658	Artifact scatter	Unknown	Owens, 1995
LA 108756	Artifact scatter	Unknown	Owens, 1995
LA 108779	Homestead	Anglo/Euroamerican	Evans, 1995
LA 108780	Homestead	Anglo/Euroamerican	Evans, 1995
LA 108781	Artifact scatter	Anglo/Euroamerican	Evans, 1995
LA 108782	Homestead	Anglo/Euroamerican	Evans, 1995
LA 111003	Railroad	Anglo/Euroamerican	Michalik, 1995
LA 113522	Lordsburg-Hachita spur	Anglo/Euroamerican	Mendez and Knight, 1996
LA 114455	Dump	Anglo/Euroamerican	Ecology and Environment, Inc., 1997
LA 126144	Habitation	Anglo/Euroamerican	Michalik, 1999
LA 126145	Utility line	Anglo/Euroamerican	Michalik, 1999
LA 126146	Dump	Anglo/Euroamerican	Michalik, 1999
LA 127072PL	Town of Cambray	Anglo/Euroamerican	Slaughter and Gibbs, 1999
LA 127073PL	Town of Carne	Anglo/Euroamerican	Slaughter and Gibbs, 1999
LA 127074PL	Homestead	Anglo/Euroamerican	Slaughter and Gibbs, 1999
LA 128637	Artifact scatter	Mogollon	Wase et al., 2000
LA 128638	Artifact scatter	Unknown Aboriginal	Wase et al., 2000
LA 128649	Dump	Anglo/Euroamerican	Wase et al., 2000
LA 129550	Artifact scatter	Unknown	Kearns et al., 2000
LA 129551	Artifact scatter with hearths	Mogollon	Kearns et al., 2000
LA 129552	Artifact scatter with hearths	Mogollon	Kearns et al., 2000
LA 129553	Artifact scatter with hearths	Unknown/Mogollon	Kearns et al., 2000
LA 129563	Artifact scatter with hearth	Mogollon	Kearns et al., 2000
LA 129564	Artifact scatter	Unknown/Anglo/Euroamerican	Kearns et al., 2000

TABLE 3.10-5 (CONTINUED)
Segment 2 Previously Recorded Sites in and Within ¼ Mile of Project Area (New Mexico Portion)

Site No.	Site Type/Constituents	Cultural/Temporal Affiliation(s)	Reference
LA 129565	Artifact scatter	Unknown	Kearns et al., 2000
LA 129566	Artifact scatter/dump	Unknown/Anglo/Euroamerican	Kearns et al., 2000
LA 129567	Artifact scatter	Archaic	Kearns et al., 2000
LA 129568	Artifact scatter	Archaic/Mogollon	Kearns et al., 2000
LA 129569	Artifact scatter, railroad bed	Anglo/Euroamerican	Kearns et al., 2000
LA 129570	Artifact scatter	Anglo/Euroamerican	Kearns et al., 2000
LA 131163	Artifact scatter	Unknown	Railey and Yost, 2001
LA 131189	Artifact scatter	Anglo/Euroamerican	Railey and Yost, 2001
LA 131190	Homestead	Anglo/Euroamerican	Railey and Yost, 2001
LA 131191	Gas station?	Anglo/Euroamerican	Railey and Yost, 2001
LA 131194	Road	Anglo/Euroamerican	Railey and Yost, 2001
LA 132119	Nonstructural	Unknown	Wase et al., 2000
LA 132120	Structural	Unknown	Wase et al., 2000
LA 132139	Structural	Prehistoric	Not submitted
LA 132140	Structural	Historic/Prehistoric	Not submitted
LA 132142	Nonstructural	Historic/Prehistoric	Not submitted
LA 134705	Dump	Anglo/Euroamerican	Russell, 2002
LA 134707	Dump	Anglo/Euroamerican	Russell, 2002
LA 134710	Artifact scatter	Mogollon	Russell, 2002
LA 135343	Structural	Prehistoric	Not submitted
LA 135806	Structural	Historic	Not submitted
LA 136069	Artifact scatter with FCR concentrations	Unknown	Fuller, 2002
LA 141735	Structural	Historic	Not submitted
LA 141736	Nonstructural	Historic	Not submitted

Archeological sites located within the project corridor for Segment 2 in New Mexico are listed in Table 3.10-6 for both previously recorded and currently recorded sites that may be impacted by the proposed action. Fifty sites occur in New Mexico, of which 29 were recommended as NRHP eligible. One bridge (No. 1705) was observed within the project ROW and is a railroad overpass on NM 549. The bridge was built in 1930, and is a steel stringer style of bridge. Its structure includes steel stringers, timber bents, and concrete smoke guards. It is an early railroad grade separation and has been recommended eligible to the NRHP under Criteria A and C (Van Citters, 2003). The project will have no sustained visual impact to the bridge. Construction will occur under the bridge. During construction there will be a moderate visual impact, but after construction the viewshed will return to its current condition. A monitor will be provided for all ground disturbing activities near and within the boundaries of sites determined eligible for the NRHP and for other areas determined to have a high potential for buried cultural deposits.

TABLE 3.10-6
Segment 2 Archaeological Sites in New Mexico: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approximate Size	Preliminary Assessment	Justification	Avoidance Option	Treatment
LA 16467	BLM	Artifact scatter with features	Jornada Mogollon	Now three artifacts	Not eligible	Lacks integrity, most of site gone		None
LA 144264	BLM	Artifact scatter with feature	Unknown	33 x 8 m	Not eligible	Fully recorded, no subsurface cultural remains		None
LA 66088	BLM	Artifact scatter with features	Jornada Mogollon	Now three fire-cracked rock artifacts	Not eligible	Lacks integrity, most of site gone		None
LA 145137	BLM	Artifact scatter with features	Jornada Mogollon	55 x 45 m	Eligible under D	Subsurface cultural remains	No, if this access road is built	Data recovery (features are near the access road)
LA 66083	BLM	Artifact scatter with features	Jornada Mogollon	410 x 211 m	Eligible under D	Subsurface staining	No, if the line starts where the survey began	Data recovery (only features 13, 19 out of ROW)
LA 146973	BLM	Artifact scatter	Euroamerican	21 x 17 m	Not eligible	Full recorded, lacks integrity		None
LA 146325	Private	Artifact scatter	Euroamerican	10 x 10 m	Not eligible	Fully recorded, lacks integrity		None
LA 27789	Private	Artifact scatter	Euroamerican	10 x 10 m	Not eligible	Fully recorded, no subsurface cultural remains		None
LA 66084	BLM	Artifact scatter with features	Unknown	181 x 86 m	Not eligible	Fully recorded, lacks integrity		None
LA 66090	BLM	Artifact scatter with features	Archaic/ Jornada Mogollon	46 x 37 m	Not eligible	Fully recorded, lacks integrity		None

TABLE 3.10-6 (CONTINUED)
Segment 2 Archaeological Sites in New Mexico: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approximate Size	Preliminary Assessment	Justification	Avoidance Option	Treatment
LA 66087	State Trust	Artifact scatter with features	Unknown	42 x 26 m	Eligible under D	Subsurface staining	No	Data recovery (3 features in ROW or close)
LA 66089/ LA 66091	BLM/ State Trust	Artifact scatter with features	Archaic/ Mogollon	267 x 130 m	Eligible under D	Subsurface staining	No	Limited data recovery within ROW (features outside)
LA 66093	BLM	Artifact scatter with features	Archaic/ Jornada Mogollon	285 x 122 m	Eligible under D	Subsurface staining	No	Limited data recovery within ROW (feature 1 close to ROW)
LA 132119	BLM	Artifact scatter	Unknown	Only two flakes, three fire-cracked rock	Not eligible	Fully recorded, lacks integrity		None
LA 66092	BLM	Artifact scatter	Unknown	Only three flakes, one groundstone, 13 fire-cracked rock	Not eligible	Fully recorded, lacks integrity		None
LA 146326	BLM	Artifact scatter	Euroamerican	90 x 75 m	Not eligible	Fully recorded, lacks integrity		None
LA 146327	State Trust	Artifact scatter	Unknown	90 x 85 m	Not eligible	Fully recorded, lacks integrity		None
LA 15330	BLM	Artifact scatter with features	Archaic/ Jornada Mogollon	725 x 609 m	Eligible under D	Intact subsurface features	No	Limited data recovery within ROW
LA 35176/ 35177/ 35178	Private	Artifact scatter with features	Jornada Mogollon	255 x 271 m	Eligible under D	Subsurface staining	No	Limited data recovery (most of site out of ROW)
LA 144267	Private	Artifact scatter	Unknown	238 x 131 m	Eligible under D	Subsurface FCR	No	Limited data recovery (over ½ of the site out of ROW)
LA 144272	Private	Artifact scatter with features	Unknown	125 x 75 m	Eligible under D	Subsurface staining	No	Data recovery (most of the site within ROW)
LA 127072	Private	Artifact scatter with features	Euroamerican	207 x 156 m	Eligible under D	Intact subsurface features	No	Data recovery/ archival

TABLE 3.10-6 (CONTINUED)
Segment 2 Archaeological Sites in New Mexico: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approximate Size	Preliminary Assessment	Justification	Avoidance Option	Treatment
LA 35244	BLM	Artifact scatter with features	Archaic/ Mogollon/ Euroamerican	1600 x 150 m	Eligible under D	Intact subsurface features		None (portion of site within ROW is just artifact scatter and very disturbed.)
LA 146343	Private	Artifact scatter	Euroamerican	20 x 30 m	Not eligible	Fully recorded, lacks integrity		None
LA 144394	Private	Part of Myndus RR stop	Euroamerican	182 x 145 m	Eligible under D	Most out of ROW	No	Limited data recovery (most out of ROW)/ archival
LA 146351	Private	Artifact scatter	Euroamerican	5 x 12 m	Not eligible	Fully recorded, lacks integrity		None
LA 127073	State Trust	Carne RR stop	Euroamerican	210 x 131 m	Eligible under D	Most out of ROW	No	Limited data recovery/ archival
LA 146333	State Trust	Well shaft	Euroamerican	0.91 x 0.91 m	Not eligible	Fully recorded, lacks integrity		Because it is an open shaft, safety precautions should be taken prior to construction around the area. Treatment recommendations include either filling in the shaft or covering with steel plating
LA 146349	BLM	Artifact scatter with a feature	Euroamerican	3 x 2 m	Not eligible	Fully recorded, lacks integrity		None
LA 144392	Private	Artifact scatter	Unknown	85 x 38 m	Not eligible	Fully recorded, lacks integrity		None
LA 144273	Private	Artifact scatter with features	Unknown	52 x 37 m	Eligible under D	Subsurface staining	Narrow north to avoid	Data recovery (most of the site is within the ROW)
LA 144274	Private	Artifact scatter with feature	Archaic/ Mogollon	399 x 240 m	Eligible under D	Subsurface features	No	Limited data recovery (most of site out of ROW)
LA 144391	Private	Artifact scatter with features	Mogollon	215 x 72 m	Not eligible	Fully recorded, lacks integrity		None

TABLE 3.10-6 (CONTINUED)
Segment 2 Archaeological Sites in New Mexico: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approximate Size	Preliminary Assessment	Justification	Avoidance Option	Treatment
LA 144389	Private	Artifact scatter with feature	Archaic	225 x 141 m	Eligible under D	Subsurface feature	No	Limited data recovery (most of site out of ROW)
LA 144271	Private	Artifact scatter with feature	Mogollon	120 x 80 m	Eligible under D	Subsurface staining	No	Data recovery (most of site within ROW)
LA 65456	Private/ NMDOT	Artifact scatter with features	Euroamerican	450 x 191 m	Eligible under D (determined by SHPO)	Subsurface cultural deposits	No	Limited data recovery/archival
LA 108658	Private	Artifact scatter	Archaic/ Euroamerican	172 x 135 m	Eligible under D	Subsurface feature	No	Limited data recovery (1 feature, out of ROW)
LA 144388	Private	Artifact scatter	Archaic	244 x 92 m	Eligible under D	Subsurface cultural remains	No	Limited data recovery (most of site out of ROW)
LA 108656/ LA 108657	Private	Artifact scatter with features	Mogollon/ Euroamerican	1321 x 307 m	Eligible under D	Subsurface staining	No	Limited data recovery (features out of ROW)
LA 108756	Private	Artifact scatter with features	Mogollon	108 x 53 m	Eligible under D	Subsurface staining	No	Limited data recovery (1 feature in ROW)
LA 144270	Private	Artifact scatter	Mogollon	153 x 107 m	Not eligible	Fully recorded, lacks integrity		None
LA 146356	Private	Artifact scatter	Euroamerican	15 x 20 m	Not eligible	Fully recorded, lacks integrity		None
LA 144269	Private	Artifact scatter	Mogollon	100 x 55 m	Not eligible	Fully recorded, no subsurface cultural remains noted		None
LA 144268	Private	Artifact scatter	Mogollon	145 x 70 m	Not eligible	Fully recorded, no subsurface cultural remains noted		None

TABLE 3.10-6 (CONTINUED)
Segment 2 Archaeological Sites in New Mexico: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approximate Size	Preliminary Assessment	Justification	Avoidance Option	Treatment
LA 146360	Private	Trash dump	Euroamerican	100 x 82 m	Not eligible	Fully recorded, lacks integrity		None
LA 146359	Private	Trash dump	Euroamerican	625 x 650 m	Not eligible	Fully recorded, lacks integrity		None
LA 146357	Private	Artifact scatter	Euroamerican	160 x 10 m	Not eligible	Fully recorded, lacks integrity		None
LA 146358	Private	Artifact scatter	Euroamerican	15 x 20 m	Not eligible	Fully recorded, lacks integrity		None
LA 146353	Private	Artifact scatter	Euroamerican	12 x 12 m	Not eligible	Fully recorded, lacks integrity		None
LA 146354	Private	Artifact scatter	Euroamerican	10 x 10 m	Not eligible	Fully recorded, lacks integrity		None
LA 146329	Private	Irrigation ditch	Euroamerican	Linear	Not eligible	Fully recorded, lacks integrity		None
LA 146355	Private	Artifact scatter with features	Euroamerican	52 x 27 m	Not eligible	Fully recorded, lacks integrity		None
LA 146345	Private	Artifact scatter with feature	Euroamerican	120 x 20 m	Not eligible	Fully recorded, lacks integrity		None
LA 144265	Private	Artifact scatter	Archaic/ Mogollon	350 x 100 m	Eligible under D	Subsurface cultural material	No	Data recovery (most of the site is within ROW.)
LA 144393	State Trust	Artifact scatter with features	Mogollon/ Euroamerican	90 x 80 m	Not eligible	Lack of subsurface cultural remains		None
LA 144266	State Trust	Mongola RR stop	Euroamerican	470 x 80 m	Not eligible	Lack of integrity		None
LA 58972	Private	Gage RR stop	Euroamerican	664 x 288 m	Eligible under A and D	Subsurface cultural material	No	Limited data recovery (just portion within ROW)/archival

TABLE 3.10-6 (CONTINUED)
Segment 2 Archaeological Sites in New Mexico: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approximate Size	Preliminary Assessment	Justification	Avoidance Option	Treatment
LA 146339	Private	Artifact scatter	Euroamerican	50 x 25 m	Not eligible	Fully recorded, lacks integrity		None
LA 146340	Private	Artifact scatter with features	Euroamerican	25 x 35 m	Not eligible	Fully recorded, lacks integrity		None
LA 146341	Private	Artifact scatter with features	Euroamerican	85 x 75 m	Not eligible	Fully recorded, lacks integrity		None
LA 127074	Private	RR siding of Wilna	Euroamerican	298 x 178 m	Eligible under A and D	Subsurface cultural remains related to the railroad	No	Revisit; limited data recovery
LA 146342	Private	Artifact scatter	Euroamerican	15 x 15 m	Not eligible	Fully recorded, lacks integrity		None
LA 114455	Private, BLM	Artifact scatter	Euroamerican	850 x 89 m	Not eligible (determined by SHPO)	Fully recorded, no subsurface cultural remains		None
LA 146344	Private	Artifact scatter with feature	Euroamerican	12 x 16 m	Not eligible	Fully recorded, lacks integrity		None
LA 5171	Private	Separ	Euroamerican	765 x 168 m	Eligible under A and D (determined by SHPO)	Intact subsurface features	No	Data recovery (portion within ROW)/archival
LA 146350	BLM	Artifact scatter	Euroamerican	60 x 25 m	Not eligible	Fully recorded, lacks integrity		None
LA 144275	Private	Lithic scatter	Unknown	94 x 80 m	Not eligible	Fully recorded, no subsurface cultural remains		None
LA 144276	Private	Artifact scatter with features	Mogollon	188 x 95m	Eligible under D	Subsurface fire-cracked rock	No	Limited data recovery

TABLE 3.10-6 (CONTINUED)
Segment 2 Archaeological Sites in New Mexico: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approximate Size	Preliminary Assessment	Justification	Avoidance Option	Treatment
LA 144277	Private	Artifact scatter	Unknown	147 x 105 m	Not eligible	Fully recorded, lacks integrity		None
LA 131194	State Trust	Historic road	Euroamerican	90 x 16 m	Not eligible	Fully recorded, no subsurface cultural remains		None
LA 111003	Private	Railroad	Euroamerican	65 x 17 m	Eligible under D (determined by SHPO)	Associated with railroad		Bore under
LA 128649	Private	Trash dump	Euroamerican	480 x 178 m	Eligible under D (determined by SHPO)	Subsurface cultural remains	No	Limited data recovery/archival (portion within ROW)
LA 146348	Private	Artifact scatter	Euroamerican	100 x 100 m	Not eligible	Fully recorded, lacks integrity		None
LA 113522	BLM	Railroad	Euroamerican	167 x 14 m	Not eligible (determined by SHPO)	Lacks integrity		None
LA 146352	State Trust	Artifact scatter with features	Euroamerican	90 x 75 m	Not eligible	Fully recorded, lacks integrity		None
LA 146334	BLM	Rock cairn	Unknown	1.3 x 1.3 m	Not eligible	Fully recorded, lacks integrity		None
LA 146335	BLM	Rock cairn	Euroamerican	2 x 2 m	Not eligible	Fully recorded, lacks integrity		None
LA 146346	BLM	Mining prospect	Euroamerican	65 x 70 m	Not eligible	Fully recorded, lacks integrity		None
LA 146337	BLM	Rock cairn	Euroamerican	1 x 1 m	Not eligible	Fully recorded, lacks integrity		None
LA 146338	State Trust	Rock cairn	Euroamerican	1 x 1 m	Not eligible	Fully recorded, lacks integrity		None

TABLE 3.10-6 (CONTINUED)
Segment 2 Archaeological Sites in New Mexico: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approximate Size	Preliminary Assessment	Justification	Avoidance Option	Treatment
LA 146347	BLM	Artifact scatter	Euroamerican	69 x 54 m	Not eligible	Fully recorded, lacks integrity	None	
LA 56186	BLM	Lithic scatter	Unknown	30 m	Not eligible	Fully recorded, lacks integrity	None	

3.10.3.2 Segment 2 (Arizona Portion)

Segment 2 cultural resources surveys conducted in the Arizona portion within 1 mile of project area are listed in Table 3.10-7. Table 3.10-8 lists the previously located sites within the same area.

TABLE 3.10-7
Segment 2 Cultural Resources Surveys Conducted In and Within 1Mile of Project Area (Arizona Portion)

Year	No. of Acres/ Miles	Client/Sponsor	Undertaking	Performing Agency/ Consultant	Reference
Segment 2 (Arizona Portion)					
1955	275 miles	Southern Pacific Pipeline	Pipeline	ASM	Holzkamper and McConville, 1955
1979	91.1 miles	MileHi Exploration	Seismographic Lines	ASM	Brew.and Ervin, 1979
					Mallouf, 1980
1982	56.5 miles	Petty-Ray Geophysical	Seismographic Lines	Powers	Frampton and Parry, 1982
1987	862 acres	US Telecom	Fiber Optic Line	Dames and Moore	O'Brien et al., 19887
1988	542 acres/ 68 miles	MCI	Fiber Optic Line	Dames and Moore	Bruder et al., 1988
1992	23.7 acres	Arizona Dept. of Transportation	Rest Area	Archaeological Research Services	Hathaway, 1992
1993	(not specified)	El Paso Natural Gas	Pipeline	Archaeological Research Services	Jensen, 1993
1994	3 miles	El Paso Natural Gas	Pipeline	Archaeological Research Services	Jensen, 1993
1994	8 miles	Valley Telephone Cooperative	Fiber Optic Line	Lone Mountain Archaeology	Seymour and Orozco, 1994

TABLE 3.10-7
Segment 2 Cultural Resources Surveys Conducted In and Within 1Mile of Project Area (Arizona Portion)

Year	No. of Acres/ Miles	Client/Sponsor	Undertaking	Performing Agency/ Consultant	Reference
1999	641 acres	Parsons Brinkerhoff Network Services	Fiber Optic Line	SWCA	Doak, David P., 2001
2000	2.3 miles	Valley Telephone Cooperative	Fiber Optic Line	Lone Mountain Archaeology	Wondrasek and Knoblock, 2001
2000	307 miles	AT&T	Fiber Optic Line	Western Cultural Resource Management	Kearns et al., 2001
2001	40 acre	Boyd-Cochran Ventures	Mine	Old Pueblo Archaeology Center	McKee, 2001

TABLE 3.10-8
Segment 2 Previously Recorded Sites in and Within 1 Mile of Project Area (Arizona Portion)

Site No.	Site Type/Constituents	Cultural/ Temporal Affiliation(s)	Reference
Segment 2 (Arizona Portion)			
AZ AA:7:505 (ASM)	Linear: pipeline	Euro-American/Late Historic	Baker, 2001
AZ CC:16:21 (ASM)	Linear: county road	Euro-American/Late Historic	Tucker and Hesse, 2000
AZ CC:16:9 (ASM)	Artifact scatter: flaked stone	San Simon Mogollon/ unspecified	Mallouf, 1979
AZ CC:16:20 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	San Simon Mogollon/ post-1150	Tucker and Hesse, 2000
AZ CC:16:22 (ASM)	Linear: county road	Euro-American/Late Historic	Tucker and Hesse, 2000
AZ CC:16:13 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	San Simon Mogollon/ unspecified	Parry and King,1982
AZ CC:16:14 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	San Simon Mogollon/ unspecified	Kinkade, 1976; Donnelly, 1984
AZ CC:16:23 (ASM)	Linear: county road	Euro-American/ Late Historic	Tucker and Hesse, 2000
AZ CC:16:74 (ASM)	Artifact scatter: sherds, flaked stone	San Simon Mogollon/ unspecified	Tucker and Hesse, 2000
AZ CC:15:75 (ASM)	Linear: county road	Euro-American/ Late Historic	Tucker and Hesse, 2000
AZ CC:16:76 (ASM)	Linear: county road	Euro-American/ Late Historic	Tucker and Hesse, 2000
AZ CC:16:80 (ASM)	Water control devices	Euro-American/ Late Historic	Tucker and Hesse, 2000

Archeological sites located within the project corridor for Segment 2 in Arizona are listed in Table 3.10-9 for both previously recorded and currently recorded sites that may be impacted by the proposed action. Three of these sites were recommended as NRHP eligible. Data recovery would be limited to the areas of potential effect. A monitor will be provided for all ground disturbing activities near and within the boundaries of sites determined eligible for the NRHP and for other areas determined to have a high potential for buried cultural deposits.

TABLE 3.10-9
Segment 2 Archaeological Sites in Arizona: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approx. Size	Preliminary Assessment	Avoidance	Comments	Treatment
AZ CC:16:30 (ASM)	BLM	Features with associated artifacts	Mogollon, San Simon Branch/ unspecified period	160 x 85 m	Eligible under D	Yes	Roasting pits with low-density scatter of sherds, flaked and ground stone; subsurface deposits likely	Fence and avoid
AZ CC:16:36 (ASM)	Private	Linear	Euroamerican/ Late Historic	10 ft (width)	Eligible under A	Yes	EPNG pipeline	Avoid
AZ CC:16:31 (ASM)	Private	Artifact scatter	Euroamerican/ Late Historic	45 x 20 m	Not eligible		High-density scatter/dump of historic and recent refuse	No treatment
AZ CC:16:22 (ASM)	Cochise County	Linear	Euroamerican/ Late Historic	25 ft (width)	Not eligible		Regularly maintained county road	No treatment
AZ CC:16:33 (ASM)	Private	Artifact scatter	Mogollon, San Simon Branch/ 1050-1100	30 x 25 m	Eligible under D	Possibly	Low-density scatter of sherds, flaked and ground stone, fire-cracked rock; subsurface deposits possible	Phase I data recovery
AZ CC:16:34 (ASM)	Private	Artifact scatter	Mogollon, San Simon Branch/ unspecified period	40 x 20 m	Eligible under D	Possibly	Low-density scatter of sherds, flaked and ground stone, fire-cracked rock; subsurface deposits possible	Phase I data recovery
AZ CC:16:35 (ASM)	BLM	Artifact scatter	Euroamerican/ Late Historic	70 x 25 m	Not eligible	No	Low-density scatter of historic refuse	No treatment
AZ CC:16:23 (ASM)	Cochise County	Linear	Euroamerican/ Late Historic	25 ft (width)	Not eligible		Regularly maintained county road	No treatment

TABLE 3.10-9 (CONTINUED)
Segment 2 Archaeological Sites in Arizona: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approx. Size	Preliminary Assessment	Avoidance	Comments	Treatment
AZ CC:16:87 (ASM)	ASLD	Artifact scatter	Mogollon, San Simon Branch/ unspecified period	35 x 20 m	Not eligible		Low-density flake scatter on bedrock	No treatment
AZ CC:15:75 (ASM)	Cochise County	Linear	Euroamerican/ Late Historic	25 ft (width)	Not eligible		Regularly maintained county road	No treatment

3.10.4 Segment 3

Tables 3.10-10 and 3.10-11 present the prefield Class I inventory of cultural resources surveys and previously recorded sites that was conducted for Segment 3. Existing data were compiled from the files at the Arizona State Historic Preservation Office (SHPO) and the Arizona State Museum (ASM) Archaeological Records Office, and from the AZSITE Database. Additional sources of information were the ASM Archives, the ASM Library, the University of Arizona Library Special Collections, the Arizona State Historical Society Library, and the BLM General Land Office (GLO) Records Database. Copies of GLO plats were obtained from the BLM Public Lands Information Center; historic USGS 15-minute and other maps were consulted in the University of Arizona Library map collection.

TABLE 3.10-10
Segment 3 Cultural Resources Surveys Conducted In and Within 1 Mile of Project Area

Year	No. of Acres/ Miles	Client/Sponsor	Undertaking	Performing Agency/ Consultant	Reference
Segment 3					
1955	275 miles	Southern Pacific Pipeline	Pipeline	ASM	Holzkamper and McConville, 1955
1973	(not specified)	USBR	Aqueduct	ASM	Grady, 1973
1974	240 miles	Arizona Public Service	Power Line	ASM	Teague and Mayro, 1974
1980	66 miles	Tucson Electric Power	Power Line	John P. Wilson	Wilson, 1980
1980	6,200 acres	USBR	Aqueduct	ASM	McCarthy, 1982
1980	20 acres	Arizona Dept. of Transportation		ASM	

TABLE 3.10-10 (CONTINUED)
Segment 3 Cultural Resources Surveys Conducted In and Within 1 Mile of Project Area

Year	No. of Acres/ Miles	Client/Sponsor	Undertaking	Performing Agency/ Consultant	Reference
1981	2 miles	Tucson Electric Power	Power Line	WNMU	Wilson, 1981
1982	100 acres/ 6 miles	USBR	Aqueduct	ASM	Czaplicki et al., 1984
1982	9 acres/ 70 miles	USBR	Aqueduct	ASM	Czaplicki et al., 1983
1983	45,490 acres	USBR, SHPO, ASLD, NSF	Tucson Basin Survey	ASM	Fish et al., 1992, 1993
1983	1 acre	Southern Pacific Pipeline	Pipeline	ASM	Madsen, 1983
1984	1,035 acres	USBR	Aqueduct	Northland Research	Marmaduke, 1993
1984	3 miles	Trico Electric Cooperative	Power Line	ASM	Castalia, 1984
1985	700 acres	USBR	Petroglyph Study	Institute for American Research	Wallace and Holmlund, 1986
1986	11.8 miles	USBR	Aqueduct	Northland Research	
1987	3.4 miles	Arizona Public Service	Power Line	Archaeological Consulting Services	Rankin, 1987
1987	19.3 acres/ 1.1 miles	USBR	Task 42 ROW	Northland Research	
1988	1.1 acres	Arizona Public Service	Power Line	Archaeological Consulting Services	Macnider, 1988
1988	506.9 acres	USBR	Aqueduct	Northland Research	Van Nimwegen and Henderson, 1991
1988	4.7 acres	Ray Stevens Paving	Landfill	Northland Research	Dosh, 1988
1989	1.4 acres/ 2,000 ft	USBR	Aqueduct	USBR	Lincoln, 1989
1989	0.3 acre	Sun Space Ranch Biosphere	Soil Sampling	Desert Archaeology	Bernard-Shaw, 1989
1989	102.9 acres	USBR	Construction Facilities	Northland Research	Van Nimwegen and Henderson, 1991

TABLE 3.10-10 (CONTINUED)
Segment 3 Cultural Resources Surveys Conducted In and Within 1 Mile of Project Area

Year	No. of Acres/ Miles	Client/Sponsor	Undertaking	Performing Agency/ Consultant	Reference
1992	3.1 miles	Arizona State Parks	Fence	Arizona State Parks	Montero, 1992
1992	29 miles	Santa Fe Pacific Pipeline	Pipeline	Archaeological Consulting Services	Crary, 1992
1992	17.8 miles	Arizona Dept. of Transportation	Highway ROW	Archaeological Research Services	Wright, 1992
1992	20 miles	Santa Fe Pacific Pipeline	Pipeline	Archaeological Consulting Services	Adams, 1992
1992	20 miles	Santa Fe Pacific Pipeline	Pipeline	Archaeological Consulting Services	Crary and Macnider, 1992
1994	70 acres	SCS Engineers	Environmental Restoration	SWCA	Roberts, 1994
1995	85 miles	DOE	Power Line	Western Cultural Resource Management	Moreno et al., 1996
1997	1.4 acre	San Xavier Rock and Minerals	Boreholes, Access Roads	Old Pueblo Archaeological Center	Jones, 1997
1997	59 miles	Woodward-Clyde Federal Services	Power Line	Desert Archaeology	Lindeman, 1997
1997	15.8 miles	Arizona Dept. of Transportation	Highway ROW	Archaeological Research Services	Lite and Cadiente, 1997
1998	40.2 miles	Arizona Dept. of Transportation	Highway ROW	Archaeological Research Services	Barz, 1998
1998	19.7 miles	Arizona Dept. of Transportation	Highway ROW	Archaeological Research Services	Woodall, 1999
1998	31.5 acres/ 25.4 miles	Southwest Gas	Pipeline	Tierra	Fratt and Rude, 1999
1999	.3 mile	Parsons	Fence line	Arizona State Land Dept.	Rozen, 1999
2000	1,332 acres/ 0.9 mile	El Paso Natural Gas	Pipeline	Archaeological Consulting Services	Punzmann, 2000
2000	11 acres	Kinder Morgan Energy Partners	Pipeline Repair	URS	Ramos et al., 2001

TABLE 3.10-10 (CONTINUED)
Segment 3 Cultural Resources Surveys Conducted In and Within 1 Mile of Project Area

Year	No. of Acres/ Miles	Client/Sponsor	Undertaking	Performing Agency/ Consultant	Reference
2000	307 miles	AT&T	Fiber Optic Line	Western Cultural Resource Management	Kearns et al., 2001
2000	1,580 acres	EcoPlan Associates	Highway ROW	Archaeological Research Services	Barnes, 2000
2001	.1 acre	Westland Resources	Well Site	Old Pueblo Archaeology Center	Jones and Dart, 2001
2001	4,200 ft	Susan E. Loosen		Old Pueblo Archaeology Center	Jones, 2001
2001	3.7 acres/ 11 miles	Westland Resources	Sewer Line	Old Pueblo Archaeology Center	Jones and Dart, 2001,2002
2001	246 acres/ 505.5 miles	PF.Net Construction	Fiber Optic Line	Western Cultural Resource Management	Baker and Webb, 2001
2001	15.5 miles	Tucson Electric Power	Power Line	Engineering and Environmental Consultants	Fuller, 2001
2001	7.8 acres/ 0.1 mile	PF.Net Construction	Op Amp Facilities	Western Cultural Resource Management	Baker and Kearns, 201
2002	282 acres	Diamond Ventures.	Housing	Old Pueblo Archaeology Center	Jones and Dart, 2002
2003	5.9 acres	Tucson Electric Power	Power Pole Replacement	Harris Environmental Group, Inc.	Knoblock and Hathaway, 2002

Notes:
DOE = U.S. Department of Energy.
USBR = U.S. Bureau of Reclamation.
WNMU = Western New Mexico University.

TABLE 3.10-11
Segment 3 Previously Recorded Sites in and Within 1 Mile of Project Area

Site No.	Site Type/Constituents	Cultural/Temporal Affiliation(s)	Reference
Segment 3			
AZ AA:12:741 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	Hohokam/ pre-Classic	Adams et al., 2000
AZ AA:12:898 (ASM)	Artifact scatter: sherds	Hohokam/ pre-Classic, Classic	Baker and Smith, 2001
AZ AA:12:870 (ASM)	Linear: Cortaro Farms Canal.	Euroamerican/Late Historic	Barnes, 2000
AZ AA:7:462 (ASM)	Former SPRR Red Rock Station	Euroamerican/ Middle-Late Historic	Crary, 1992 Greenwald, 2000
AZ AA:7:506 (ASM)	Linear: pipeline	Euroamerican/Late Historic	Baker, 2001
AZ AA:7:6 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	Hohokam/ pre-Classic	Wright and McCarthy, 1980
AZ AA:7:32 (ASM)	Rock pile with assoc. sherds, flaked stone, ground stone	Hohokam/ unspecified	Wright and McCarthy, 1980
AZ AA:7:461 (ASM)	Rock alignment	Hohokam/ unspecified	Hackbarth and Hutira, 1989
AZ AA:7:504 (ASM)	Former highway maintenance yard/roadside park	Euroamerican/Late Historic	Baker, 2001
AZ AA:7:463 (ASM)	Railroad ties	Euroamerican/ Late Historic	Crary, 1992
AZ AA:7:71 (ASM)	Roasting pits with assoc. sherds, flaked stone, ground stone	Hohokam/ unspecified	Downum, 1982
AZ AA:7:502 (ASM)	Picacho Pass Skirmish Site	Euroamerican/ Middle Historic	Strader et al., 2000
AZ AA:7:72 (ASM)	Roasting pits with assoc. sherds, flaked stone, ground stone	Hohokam/ unspecified	Downum, 1982
AZ AA:7:16 (ASM)	Bedrock mortars and petroglyphs with assoc. sherds	Hohokam/ unspecified	Ayres, 1967
AZ AA:7:74 (ASM)	Roasting pit with assoc. sherds, flaked stone, ground stone	Hohokam/ pre-Classic	Downum, 1982
AZ AA:7:456 (ASM)	Rock alignments, rock piles, and rock rings	Unknown	Hackbarth and Hutira, 1989
AZ AA:7:17 (ASM)	Bedrock mortars	Hohokam/ unspecified	Ayres, 1967
AZ AA:7:454 (ASM)	Artifact scatter: sherds, flaked stone	Hohokam/ unspecified	Hackbarth and Hutira, 1989
AZ AA:7:455 (ASM)	Artifact scatter: sherds, flaked stone, historic refuse	Hohokam/ unspecified; Euroamerican/ Late Historic	Hackbarth and Hutira, 1989
AZ AA:7:55 (ASM)	Rock alignments with assoc. sherds	Hohokam/ unspecified	Dart and Mayberry, 1982

TABLE 3.10-11 (CONTINUED)
Segment 3 Previously Recorded Sites in and Within 1 Mile of Project Area.

Site No.	Site Type/Constituents	Cultural/Temporal Affiliation(s)	Reference
AZ AA:7:33 (ASM)	Artifact scatter: sherds, flaked stone, historic refuse	Hohokam/ unspecified; Euroamerican/ Middle-Late Historic	McCarthy, 1980
AZ AA:7:30 (ASM)	Rock piles and rock rings with assoc. sherds, flaked stone, ground stone	Hohokam/ unspecified	McCarthy, 1980
AZ AA:7:88 (ASM)	Hearth with assoc. flaked stone, ground stone	Hohokam/ unspecified	Quillian, 1986
AZ AA:7:465 (ASM)	Former SPRR Picacho Station	Euroamerican/ Late Historic	Crary et al., 1992
AZ AA:7:464 (ASM)	Artifact scatter: sherds	O'Odham/ Protohistoric-Historic; Euroamerican/ Late Historic	Crary et al., 1992
AZ AA:6:69 (ASM)	House foundation	Euroamerican/ Late Historic	Doak, 1999
AZ T:10:84 (ASM)	Linear: SPRR (now UPRR) Picacho-Phoenix-Wellton Loop	Euroamerican/ Late Historic	Woodall et al., 1994 Kearns, 2000
AZ AA:6:63 (ASM)	Artifact scatter: sherds, flaked stone	Hohokam/ unspecified	Dart and Mayberry, 1982
AZ AA:6:47 (ASM)	Artifact scatter: sherds	Hohokam/ pre-Classic	Crary et al., 1992
AZ AA:6:51 (ASM)	Trash mound and possible ball court with assoc. sherds, flaked stone, ground stone, shell	Hohokam/ Classic	Euler and Roberts, 1994
AZ AA:2:118 (ASM)	Linear: SR 84	Euroamerican/ Late Historic	Wright, 1992; Baker, 2001
AZ AA:11:30 (ASM)	Artifact scatter: historic refuse	Euroamerican/ Late Historic	Rosenberg, 1984
AZ AA:8:79 (ASM)	Hearth with assoc. sherds, flaked stone, ground stone	Hohokam/ unspecified	Field, 1985
AZ AA:7:503 (ASM)	Linear: road to Marana Air Base	Euroamerican/ Late Historic	Baker, 2001
AZ AA:7:24 (ASM)	Artifact scatter: sherds (site destroyed)	Hohokam/ unspecified	Lange, 1980
AZ AA:7:34 (ASM)	Artifact scatter: historic refuse	Unknown	McCarthy, 1980
AZ AA:7:5 (ASM)	Artifact scatter: sherds	Hohokam, unspecified	Wasley, 1958
AZ AA:7:73 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	Hohokam/ unspecified	Downum, 1982
AZ AA:7:66 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	Hohokam/ unspecified	Dart and Mayberry, 1982
AZ AA:7:65 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	Hohokam/ unspecified	Dart and Mayberry, 1982

TABLE 3.10-11 (CONTINUED)
Segment 3 Previously Recorded Sites in and Within 1 Mile of Project Area.

Site No.	Site Type/Constituents	Cultural/Temporal Affiliation(s)	Reference
AZ AA:6:48 (ASM)	Artifact scatter: sherds, flaked stone, ground stone, shell	Hohokam/ pre-Classic	Crary et al., 1992
AZ Z:2:40 (ASM)	Linear: former SPRR Transatlantic Route, now UPRR main line	Euroamerican/ Middle-Late Historic	Woodall et al., 1994.
AZ AA:2:176 (ASM)	Linear: county road	Euroamerican/Late Historic	Stone et al., 1998
AZ AA:2:175 (ASM)	Linear: county road	Euroamerican/ Late Historic	Stone et al., 1998
AZ AA:2:123 (ASM)	Artifact scatter: sherds, flaked stone	Hohokam/ pre-Classic	Crary et al., 1992
AZ AA:2:72 (ASM)	Artifact scatter: sherds, flaked stone	Hohokam/ Classic	Kenny, 1984
AZ AA:2:73 (ASM)	Artifact scatter: sherds, ground stone	Hohokam/ pre-Classic	Kenny, 1984
AZ AA:2:74 (ASM)	Artifact scatter: sherds, flaked stone	Hohokam/ unspecified	Marmaduke, 1993
AZ AA:2:75 (ASM)	Artifact scatter: sherds, flaked stone	Hohokam/ pre-Classic	Kenny, 1984
AZ AA:2:122 (ASM)	Artifact scatter: sherds, flaked stone	Hohokam/ pre-Classic O'Odham/ Protohistoric-Historic	Crary et al., 1992
AZ AA:2:65 (ASM)	Artifact scatter: sherds	Hohokam/ pre-Classic	Wasley, 1963; Skibo, 1984
AZ AA:2:101 (ASM)	Structural mound and trash mound with assoc, sherds, flaked stone, ground stone, shell	Hohokam/Classic	Skibo, 1984; Adams, 1992
AZ AA:2:116 (ASM)	Artifact scatter: sherds, flaked stone	Hohokam/pre-Classic, Classic	Skibo, 1984
AZ AA:2:142 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	Hohokam/pre-Classic, Classic	Barz and Neeley, 1998
AZ AA:2:71 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	Hohokam/ Classic	Kenny, 1984
AZ AA:7:31 (ASM)	Rock piles with assoc. sherds, flaked stone	Hohokam/ unspecified	Wright and McCarthy, 1980
AZ AA:7:457 (ASM)	Rock alignment and rock rings with assoc. sherds	Hohokam/ unspecified	Hackbarth and Hutira, 1989
AZ AA:7:459 (ASM)	Rock rings with assoc. sherds	Hohokam/ unspecified	Hackbarth and Hutira, 1989
AZ AA:7:247 (ASM)	Roasting pit with assoc. sherds, flaked stone, ground stone	Hohokam/ unspecified	Bayman, 1985
AZ AA:7:259 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	Hohokam/ unspecified	Ervin, 1985

Table 3.10-12 presents NRHP eligibility and treatment recommendation for both previously recorded and currently recorded sites in Segment 3 that may be impacted by the proposed action. Thirteen of these sites were recommended as NRHP eligible. A monitor will be provided for all ground disturbing activities near and within the boundaries of sites determined eligible for the NRHP and for other areas determined to have a high potential for buried cultural deposits.

TABLE 3.10-12
Segment 3 Archaeological Sites in Arizona: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approx. Size	Preliminary Assessment	Avoidance	Comments	Treatment
AZ AA:7:528 (ASM)	Private	Artifact scatter	Hohokam/ unspecified period	110 x 50 m	Eligible under D		Low-density scatter of sherds, flaked and ground stone, fire-cracked rock	Phase I data recovery
AZ AA:7:462 (ASM)	UPRR	Features with associated artifacts	Euroamerican/ Middle-Late Historic	500 x 160 ft	Eligible under A, C	Yes	Former SPRR Red Rock Station; remainder of site lacks integrity	Avoid
AZ AA:7:529 (ASM)	ASLD, Private	Features with associated artifacts	Euroamerican/ Late Historic	460 x 130 ft	Eligible under A, D	No	Remains of water control features and corral with low-density scatter of metal artifacts	Phase I data recovery
AZ AA:7:506 (ASM)	ASLD	Linear	Euroamerican/ Late Historic	10 ft (width)	Not eligible	Yes	EPNG pipeline	Avoid
AZ AA:7:6 (ASM)	ASLD	Artifact scatter	Hohokam/ pre-Classic	600 x 140 m	Eligible under D	No	Low-to-medium-density scatter of sherds, flaked and ground stone; subsurface deposits possible	Phase I data recovery (and II if needed)
AZ AA:7:530 (ASM)	Private	Artifact scatter	Hohokam/ unspecified period	30 x 10 m	Eligible under D	Possibly	Low-density scatter of sherds; subsurface deposits unlikely	Phase I data recovery
AZ AA:7:531 (ASM)	ASLD	Linear	Euroamerican/ Middle Historic	520 x 20 ft	Eligible under A, C	Yes	Remains of grade and trestle of 1880 SPRR route (realigned 1897)	Mitigative documenta-tion
AZ AA:7:532 (ASM)	ASLD	Artifact scatter	Hohokam/ unspecified period	15 x 10 m	Eligible under D	No	Low-density scatter of sherds and flaked stone; subsurface deposits not likely	Phase I data recovery

TABLE 3.10-12 (CONTINUED)
Segment 3 Archaeological Sites in Arizona: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approx. Size	Preliminary Assessment	Avoidance	Comments	Treatment
AZ AA:7:505 (ASM)	Private	Linear	Euroamerican/ Late Historic	10 ft (width)	Eligible under A	Yes	EPNG pipeline	Avoid
AZ AA:7:533 (ASM)	ASLD	Artifact scatter	Hohokam/ unspecified period	15 x 15 m	Eligible under D	No	Low-density scatter of sherds and flaked stone; subsurface deposits unlikely	Phase I data recovery
AZ AA:7:33 (ASM)	ASLD	Artifact scatter	Hohokam/ unspecified period	30 x 25 m	Eligible under D	No	Low-density scatter of sherds, flaked stone; subsurface deposits unlikely	Phase I data recovery
AZ T:10:84 (ASM)	UPRR	Linear	Euroamerican/ Late Historic	45 ft (width)	Eligible under A	Yes	SPRR (now UPRR) Picacho-Phoenix-Wellton Loop	Avoid
AZ AA:2:118 (ASM)	Pinal County	Linear	Euroamerican/ Late Historic	60 ft (width)	Eligible under A	Yes	SR 84	Avoid
AZ AA:6:48 (ASM)	UPRR	Artifact scatter	Hohokam/ pre-Classic	175 x 100 m	Eligible under D	No	Low-to-medium-density scatter of sherds flaked and ground stone, shell; subsurface deposits possible	Phase I data recovery (and II if needed)
AZ Z:2:40 (ASM)	UPRR	Linear	Euroamerican/ Middle-Late Historic	45 ft (width)	Eligible under A	Yes	Former SPRR Transcontinental Route, now UPRR main line	Avoid
AZ AA:6:96 (ASM)	UPRR	Artifact scatter	Hohokam/ pre-Classic	110 x 35 m	Eligible under D	No	Low-to-medium-density scatter of sherds and flaked stone; subsurface deposits possible.	Phase I data recovery (and II if needed)
AZ AA:2:176 (ASM)	Pinal County	Linear	Euroamerican/ Late Historic	25 ft (width)	Not eligible		Regularly maintained county road	No treatment
AZ AA:2:175 (ASM)	Pinal County	Linear	Euroamerican/ Late Historic	25 ft (width)	Not eligible		Regularly maintained county road	No treatment

TABLE 3.10-12 (CONTINUED)
Segment 3 Archaeological Sites in Arizona: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approx. Size	Preliminary Assessment	Avoidance	Comments	Treatment
AZ AA:2:123 (ASM)	UPRR	Artifact scatter	Hohokam/ pre-Classic	200 x 40 m	Eligible under D	No	Medium-density scatter of sherds, flaked stone; subsurface deposits possible	Phase I data recovery (and II if needed)
AZ AA:2:122 (ASM)	UPRR	Artifact scatter	Hohokam/ pre-Classic; O'odham/ Protohistoric-Historic	130 x 60 m	Eligible under D	No	Medium-density scatter of sherds, flaked stone; subsurface deposits possible	Phase I data recovery (and II if needed)

3.10.5 Segment 4

Tables 3.10-13 and 3.10-14 present the prefield Class I inventory of cultural resources surveys and previously recorded sites that was conducted for Segment 4. Existing data was compiled from the files at the Arizona State Historic Preservation Office (SHPO) and the Arizona State Museum (ASM) Archaeological Records Office, and from the AZSITE Database. Additional sources of information were the ASM Archives, the ASM Library, the University of Arizona Library Special Collections, the Arizona State Historical Society Library, and the BLM General Land Office (GLO) Records Database. Copies of GLO plats were obtained from the BLM Public Lands Information Center; historic USGS 15-minute and other maps were consulted in the University of Arizona Library map collection.

TABLE 3.10-13
Segment 4 Cultural Resources Surveys Conducted In and Within 1 Mile of Project Area

Year	No. of Acres/Miles	Client/Sponsor	Undertaking	Performing Agency/ Consultant	Reference
Segment 4					
1955	275 miles	Southern Pacific Pipeline	Pipeline	ASM	Holzkamper and McConville, 1955
1964	7868 sq. miles	Maricopa Co. Dept. of Parks and Recreation	Archaeological Reconnaissance	ASM	Ayres, 1965
1969	14 miles	El Paso Natural Gas	Pipeline	ASM	
1980	19.2 miles	Provident Energy	Pipeline	ASM	
1980	(not specified)	Arizona Dept. of Transportation	Materials Pit	ASM	
1980	100 acres	Casa Grande Copper	Mining Easement	ASM	Madsen, 1980

TABLE 3.10-13 (CONTINUED)
Segment 4 Cultural Resources Surveys Conducted In and Within 1 Mile of Project Area

Year	No. of Acres/Miles	Client/Sponsor	Undertaking	Performing Agency/ Consultant	Reference
1983	10 acres	Pinal County	State Land Survey	ASM	Lange, 1983
1984	7.4 acres	Pinal County	State Land Survey	ASM	Lange, 1984
1984	3.6 acres/ 0.8 mile	Pinal County	State Land Survey	ASM	Lange, 1984
1985	0.7 acre	W. A. and D. Dunn	State Land Survey	ASM	
1986	591 acres/ 18.9 miles	Bureau of Reclamation	Aqueduct	Northland Research	
1986	267 acres/ 22 miles	Dibble and Associates	ROW	ARS	Fedick, 1986
1986	85 acres	Gila River Housing Authority	Housing	ASM	Sires, 1986
1987	(not specified)	Superstition Crushing	Drilling	ASM	Euler, 1987
1987	342 acres	K. K. Skousen	State Land Survey	Casa Grande Historical Museum	Smithwick, 1987
1988	7.8 miles	USBR	Pipeline	USBR	MacDonald, 1988
1988	120 acres	Calmat Co.	State Land survey	ASM	Roth, 1988
1989	345 miles	Pinal County	Highway ROW	Archaeological Consulting Services	Adams, 1989
1991	312 acres/ 63.2 miles	El Paso Natural Gas	Pipelines	Archaeological Consulting Services	Neily, 1991
1992	3.4 acres	USBR	Ditch Easement	USBR	Telles, 1992
1992	29 miles	Santa Fe Pacific Pipeline	Pipeline	Archaeological Consulting Services	Crary, 1992
1992	20 miles	Santa Fe Pacific Pipeline	Pipeline	Archaeological Consulting Services	Crary and Macnider, 1992
1992	6.1 miles	Maricopa Domestic Water District	Pipeline	SWCA	Roberts, 1992
1993	18.6 acres	El Paso Natural Gas	Cathodic Station	Archaeological Consulting Services	Troncone, 1993
1994	118.2 acres	Arizona Dept. of Transportation	Realignment	Archaeological Consulting Services	Crary, 1994
1995	64 acres	Maricopa Co. Dept. of Transportation	Highway ROW	Soil Systems	Owens, 1995
1996	41.4 miles	SFC Engineering	Fiber Optic Line	Archaeological Research Services	Lite et al., 1996
1997	6.6 miles	Maricopa Co. Dept. of Transportation	Highway ROW	Dames and Moore	Shepard and Rogge, 1997

TABLE 3.10-13 (CONTINUED)
Segment 4 Cultural Resources Surveys Conducted In and Within 1 Mile of Project Area

Year	No. of Acres/Miles	Client/Sponsor	Undertaking	Performing Agency/ Consultant	Reference
1997	121.2 acres	Coe and Van Loo Consultants	Santa Rosa Wash	Archaeological Research Services	Wright, 1997
1998	6 miles	Maricopa Domestic Water District	Pipeline, Wells	Northland Research	Walsh, 1998
1998	135.2 acres	City of Phoenix	Pipeline	Logan Simpson Design	Shaw, 2000
1999	56 acres	Richmond American Homes	Housing	Northland Research	Walsh-Anduze, 1999
1999	30.5 acres	Vulcan Materials	Construction	Archaeological Research Services	Coriell, 1999
1999	309 acres	City of Phoenix	Sewer	Logan Simpson Design	Grafil, 2000
1999	234 acres	El Paso Natural Gas	Pipeline	Archaeological Consulting Services	Aguila, 1999
2000	259 acres/ 9.4 miles	Reliant Energy	Pipelines, Ponds	Dames and Moore	Rogge, 2000
2000	1.5 mile	Pima County Dept. of Public Works	Highway ROW	Logan Simpson Design	Coutright, 2000
2000	1.6 acre	ATC Association	Construction	SWCA	Solometo, 2000
2000	152 acres	AGRA Earth and Environment	Construction	SWCA	Mitchell and Ryden, 2000
2000	125 acres	AGRA Earth and Environment	Construction	SWCA	Mitchell and Ryden, 2000
2000	37.1 miles	Valley Telephone Cooperative	Fiber Optic Line	Lone Mountain Archaeological Services	Wondrasek and Fahrni, 2001
2001	174 acres	Maricopa Co. Flood Control District	Flood Control Channel	URS	White et al., 2001
2002	123 acres	Miller Holdings	Construction	SWCA	Lundin and Foster, 2002
2002	296 acres	Miller Holdings	Construction	SWCA	Lundin and Foster, 2002
2003	4,338 ft	Arizona Dept. of Transportation	ROW Abandonment	Archaeological Consulting Services	Aquila, 2002
2003	6.2 acres	Withey, Anderson, and Morris	Utility Line	Archaeological Research Services	Wright, 2003

TABLE 3.10-14
Segment 4 Previously Recorded Sites in and Within 1 Mile of Project Area

Site No.	Site Type/Constituents	Cultural/ Temporal Affiliation(s)	Reference
Segment 4			
AZ AA:1:91 (ASM)	Former SPRR siding	Euroamerican/ Late Historic	Crary, 1989; Bauer et al., 2000
AZ U:13:5 (ASM)	Artifact scatter: sherds (site destroyed)	Hohokam/ pre-Classic	Wasley, 1958
AZ U:13:238 (ASM)	Former SPRR siding	Euroamerican/ Late Historic	Crary, 1989
AZ T:16:101 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	Hohokam/ pre-Classic	Quillian, 1988
AZ T:16:42 (ASM)	Artifact scatter: sherds, flaked stone	Hohokam/ unspecified	Harlan et al., 1962
AZ T:16:2 (ASM)	Artifact scatter: sherds	Hohokam/ unspecified	Ezell and Schroeder, 1939 Wasley, 1958
AZ T:16:21 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	Hohokam/ unspecified	
AZ T:16:130 (ASM)	Linear: SR 347	Euroamerican/ Late Historic	Brown and Courtright, 2000
AZ T:16:118 (ASM)	Artifact scatter: sherds, flaked stone, ground stone, shell; possible burials	Hohokam/ unspecified	Roberts, 1992
AZ T:16:99 (ASM)	Artifact scatter: sherds, flaked stone, ground stone, shell	Hohokam/ Classic; Akimel O'Odham/ Protohistoric-Historic	Fedick, 1986 Hutira, 1987
AZ T:16:4 (ASM)	Artifact scatter: sherds, flaked stone	Hohokam/ Classic; Akimel O'Odham/ Protohistoric-Historic	Wasley, 1958
AZ T:16:3 (ASM)	Artifact scatter: sherds	Hohokam/ Classic	Wasley, 1958
AZ T:16:117 (ASM)	Artifact scatter: sherds, flaked stone, ground stone.	Hohokam/ Classic	Stone, 1991
AZ T:16:115 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	Hohokam/ unspecified	Smithwick and Smithwick, 1987
AZ T:16:5 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	Hohokam/ Classic; Akimel O'Odham/ Protohistoric-Historic	Wasley, 1958 Adams, 1990
GR-891	Artifact scatter: sherds, flaked stone	Hohokam/ unspecified	Morgan et al., 2000
GR-892/ AZ T:16:108 (ASM)	Artifact scatter: sherds, flaked stone, ground stone, shell	Hohokam/ pre-Classic, Classic; Akimel O'Odham/ Protohistoric-Historic	Adams, 1990 Morgan et al., 2000
AZ T:16:10 (ASM)	Maricopa Wells	Euroamerican/ Middle Historic	Urban, 1977

TABLE 3.10-14 (CONTINUED)
Segment 4 Previously Recorded Sites in and Within 1 Mile of Project Area

Site No.	Site Type/Constituents	Cultural/ Temporal Affiliation(s)	Reference
GR-893/ AZ T:16:6 (ASM)	Deflated mounds with assoc. sherds, flaked stone, ground stone, shell; burials present	Hohokam/ pre-Classic, Classic; Akimel O'Odham/ Protohistoric-Historic	Wasley, 1958 Adams, 1990 Morgan et al., 2000
GR-894/ AZ T:16:112 (ASM)	Deflated mounds and roasting pits with assoc. sherds, flaked stone, ground stone, shell; burials present	Hohokam/pre-Classic, Classic; Akimel O'Odham/ Protohistoric-Historic	Adams, 1990 Crary et al., 1992 Morgan et al., 2000
GR-895/ AZ T:16:7 (ASM)/ AZ T:16:111 (ASM)	Deflated mounds with assoc. sherds, flaked stone, ground stone, shell; burials present	Hohokam/ pre-Classic, Classic; Akimel O'Odham, Pee Posh/ Protohistoric-Historic	Wasley, 1958 Adams, 1990 Crary et al., 1992 Morgan et al., 2000
GR-896/ AZ T:16:109 (ASM)	Deflated mounds with assoc. sherds, flaked stone, ground stone, shell; burials present	Hohokam, pre-classic, Classic; Akimel O'Odham, Pee Posh/ Protohistoric-Historic	Adams, 1990 Crary et al., 1992 Morgan et al., 2000
AZ T:16:110 (ASM)	Artifact scatter: sherds, flaked stone, ground stone, shell; burials present	Hohokam/ pre-Classic, Classic; Akimel O'Odham, Pee Posh/ Protohistoric-Historic	Adams, 1990 Crary et al., 1992
AZ T:16:46 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	Hohokam/ unspecified	Westfall, 1980
AZ T:16:30 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	Hohokam/ unspecified	Fiero, 1969
AZ T:16:34 (ASM)	Artifact scatter: sherds, flaked stone	Hohokam/ unspecified	Wasley and Fiero, 1969
GR-1093	Artifact scatter: sherds, flaked stone	Hohokam/ unspecified	Touchin and Peterson, 2001
AZ T:12:29 (ASM)	Artifact scatter: sherds	Hohokam/ pre-Classic	Gordon, 1972
AZ T:12:27 (ASM)	Artifact scatter: sherds	Hohokam/ unspecified	Gordon, 1972
AZ T:12:26 (ASM)	Artifact scatter: sherds	Hohokam/ unspecified	Gordon, 1972
GR-1094	Rock piles, rock alignments	Hohokam/ unspecified	Touchin and Peterson, 2001
AZ T:12:31 ASM)	Artifact scatter: sherds	Hohokam/ Classic	Gordon, 1972
AZ T:12:28 (ASM)	Artifact scatter: sherds	Hohokam/ Classic	Gordon, 1972
AZ T:12:30 (ASM)	Artifact scatter: sherds	Hohokam/ pre-Classic; Akimel O'Odham/ Protohistoric-Historic	Gordon, 1972
AZ T:12:25 (ASM)	Artifact scatter: sherds, flaked stone, ground stone	Hohokam/ pre-Classic, Classic; Akimel O'Odham/ Protohistoric, Historic	Gordon, 1972

TABLE 3.10-14 (CONTINUED)
Segment 4 Previously Recorded Sites in and Within 1 Mile of Project Area

Site No.	Site Type/Constituents	Cultural/ Temporal Affiliation(s)	Reference
AZ T:12:24 (ASM)	Mound with assoc. sherds, flaked stone, ground stone	Hohokam/ unspecified	Gordon, 1972
AZ T:12:15 (ASM)	Compound walls	Unknown	Midvale, 1963
AZ T:12:19 (ASM)	Rock Pile	Hohokam/ unspecified	Gordon, 1972
GR-1008	Rock Piles	Hohokam/ unspecified	Vincent and Randolph, 1995
AZ T:12:14 (ASM)	Artifact scatter: sherds	Hohokam/ pre-Classic, Classic	Gordon, 1972
AZ T:12:23 (ASM)	Artifact scatter: sherds, historic refuse	Akimel O'Odham/ Middle-Late Historic	Gordon, 1972
AZ T:12:22 (ASM)	Artifact scatter: sherds	Hohokam/ unspecified; Akimel O'odham/ Middle-Late Historic	Gordon, 1972
AZ T:12:16 (ASM)	Rock piles	Hohokam/ unspecified	Gordon, 1972
AZ T:12:17 (ASM)	Artifact scatter: sherds	Hohokam/ unspecified	Gordon, 1972
AZ T:12:21 (ASM)	Rock piles	Hohokam/ unspecified	Gordon, 1972
GR-1003	Rock piles	Hohokam/ unspecified	Ensor and Rubenstein, 1995
AZ T:12:18 (ASM)	Artifact scatter: sherds	Hohokam/ pre-Classic, Classic	Gordon, 1972
AZ T:12:12 (ASM)	Petroglyph	Hohokam/ unspecified	Gordon, 1972
AZ T:12:20 (ASM)	Roasting pit and rock piles	Hohokam/ unspecified	Gordon, 1972
GR-1002	Rock piles	Hohokam/ unspecified	Ensor and Rubenstein, 1995
AZ T:12:13 (ASM)	Rock piles with assoc. sherds	Hohokam/ unspecified	Gordon, 1972
GR-1082/ AZ T:12:80 (ASM)	Pumping station	Akimel O'Odham/ Late Historic	Crary et al., 1992
GR-1083/ AZ T:12:79 (ASM)	Rock piles	Hohokam/ unspecified	Crary et al., 1992
AZ T:12:64 (ASM)	Artifact scatter: sherds (collected)	Hohokam/ unspecified	Adams, 1990
AZ T:12:112 (ASM)	Mound and clearing	Akimel O'Odham/ Middle-Late Historic	Webb et al., 1998
AZ T:12:142 (ASM)	Canal	Hohokam/ unspecified	Hart, 2000
AZ T:12:143 (ASM)	Canal	Hohokam/ unspecified	Hart, 2000

Table 3.10-15 presents NRHP eligibility and treatment recommendation for both previously recorded and currently recorded sites in Segment 4 that may be impacted by the proposed action. Twenty-three of these sites were recommended as NRHP eligible. A monitor will be provided for all ground disturbing activities near and within the boundaries of sites determined eligible for the NRHP and for other areas determined to have a high potential for buried cultural deposits.

TABLE 3.10-15
Segment 4 Archaeological Sites in Arizona: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approx. Size	Preliminary Assessment	Avoidance	Comments	Treatment
AZ AA:1:147 (ASM)	Pinal County	Linear	Euroamerican/ Late Historic	25 ft (width)	Not eligible	No	Regularly maintained county road	Avoid
AZ U:13:5 (ASM)	Private	Artifact scatter	Hohokam/ pre-Classic	40 x 15 m	Not eligible	No	Site destroyed	No treatment
AZ U:13:238 (ASM)	UPRR	Features with associated artifacts	Euroamerican/ Late Historic	80 x 80 ft	Not eligible	No	Former SPRR siding; site destroyed	No treatment
AZ T:16:154 (ASM)	UPRR	Artifact scatter	Hohokam/ pre-Classic	620 x 50 m	Eligible under D	Yes	Low- to-medium-density scatter of sherds, flaked and ground stone, shell; most of scatter in fill of RR embankment outside of ROW, but fill taken from ROW; subsurface remains possible in ROW	Fence & avoid
AZ T:16:2 (ASM)	Private	Artifact scatter	Hohokam/ unspecified period	unknown	Not eligible		Site destroyed	No treatment
AZ T:16:118 (ASM)	Private	Artifact scatter	Hohokam/ unspecified period	125 x 85 m	Eligible under D	Yes	Low-density scatter of sherds, flaked and ground stone, shell; subsurface deposits likely, including burials	Avoid
AZ T:16:155 (ASM)	Private	Artifact scatter	Hohokam/ unspecified period	40 x 15 m	Eligible under D	Yes	Low-density scatter of sherds and flaked stone	Avoid
AZ T:16:4 (ASM)	ASLD	Artifact scatter	Hohokam/ Classic; Akimel O'Odham/ Protohistoric-Historic	350 x 220 m	Eligible under D	No	Low-density scatter of sherds, flaked stone; subsurface deposits possible	Phase I data recovery (and II if needed)

TABLE 3.10-15 (CONTINUED)
Segment 4 Archaeological Sites in Arizona: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approx. Size	Preliminary Assessment	Avoidance	Comments	Treatment
GR-1430/AZ T:16:5 (ASM)	GRIC	Artifact scatter	Hohokam/ Classic; Akimel O'Odham/ Protohistoric-Historic	440 x 60 m	Eligible under D	No	Low-to-medium-density scatter of sherds, flaked and ground stone; subsurface deposits possible	Phase I data recovery
GR-891	GRIC	Artifact scatter	Hohokam/ Classic; Akimel O'Odham/ Protohistoric-Historic	350 x 60 m	Eligible under D	No	Low-density scatter of sherds, flaked stone; subsurface deposits possible	Phase I data recovery
GR-1431	GRIC	Artifact scatter	Hohokam/ pre-Classic	100 x 60 m	Eligible under D	No	Low-to-medium-density scatter of sherds, flaked stone; subsurface deposits possible	Phase I data recovery
GR-1432	GRIC	Artifact scatter	Hohokam/ pre-Classic	40 x 30 m	Eligible under D	Yes	Low-density scatter of sherds, flaked stone; subsurface deposits unlikely	Phase I data recovery
GR-1433	GRIC	Artifact scatter	Hohokam/ pre-Classic	40 x 15 m	Eligible under D	No	Low-density scatter of sherds, flaked stone; subsurface deposits unlikely	Phase I data recovery
GR-1434	GRIC	Artifact scatter	Hohokam/ pre-Classic	45 x 20 m	Eligible under D	Possibly	Low-density scatter of sherds, flaked stone; subsurface deposits unlikely	Phase I data recovery
GR-1435	GRIC	Artifact scatter	Hohokam/ unspecified period; Akimel O'Odham/ Protohistoric-Historic	40 x 15 m	Eligible under D	Yes	Low-density scatter of sherds, flaked stone; subsurface deposits possible	Fence & Avoid
GR-1436	GRIC	Artifact scatter	Hohokam/ pre-Classic	215 x 60 m	Eligible under D	No	Low-to-medium density scatter of sherds, flaked stone; subsurface deposits possible	Phase I data recovery
GR-892/ AZ T:16:108 (ASM)	GRIC	Artifact scatter	Hohokam/ pre-Classic, Classic; Akimel O'Odham/ Protohistoric-Historic	800 x 60 m	Eligible under D	No	Low-to-medium-density scatter of sherds, flaked and ground stone, shell; subsurface deposits possible	Phase I data recovery

TABLE 3.10-15
Segment 4 Archaeological Sites in Arizona: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approx. Size	Preliminary Assessment	Avoidance	Comments	Treatment
GR-1438	GRIC	Artifact scatter	Hohokam/ Classic	120 x 35 m	Eligible under D	No	Low-density scatter of sherds, flaked stone; subsurface deposits possible	Phase I data recovery
GR-1437	GRIC	Linear	Akimel O'Odham, Euroamerican/ Middle Historic	10 ft (width)	Eligible under A, D	Yes	Documented as Sacaton-Maricopa Wells Road in 1876	Mitigative Documentation
GR-893/ AZ T:16:6 (ASM)	GRIC	Features with associated artifacts	Hohokam/ pre-Classic, Classic; Akimel O'Odham/ Protohistoric-Historic	750 x 60 m	Eligible under D	No	Deflated mounds with low-to-high-density scatter of sherds, flaked and ground stone, shell; burials present	Phase I and II data recovery
GR-894/ AZ T:16:112 (ASM)	GRIC	Features with associated artifacts	Hohokam/ pre-Classic, Classic; Akimel O'Odham/ Protohistoric-Historic	1030 x 60 m	Eligible under D	No	Deflated mound with low-to-high-density scatter of sherds, flaked and ground stone, shell; burials present	Phase I and II data recovery
GR-894/ GR-895/ AZ T:16:7 (ASM)	GRIC	Features with associated artifacts	Hohokam/ pre-Classic, Classic; Akimel O'Odham, Pee Posh/ Protohistoric-Historic	2960 x 60 m	Eligible under D	No	Deflated mound with low-to-high-density scatter of sherds, flaked and ground stone, shell; burials present	Phase I and II data recovery
GR-1439	GRIC	Linear	Akimel O'Odham/ Late Historic	30 ft (width)	Eligible under A	Yes	Santa Cruz Ditch	Mitigative Documentation
GR-1440	GRIC	Linear	Akimel O'Odham/ Late Historic	30 ft (width)	Eligible under A	Yes	Hoover Ditch	Mitigative Documentation
GR-1441/AZ T:16:110 (ASM)	GRIC	Artifact scatter	Hohokam/ pre-Classic, Classic; Akimel O'Odham, Pee Posh/ Protohistoric-Historic	150 x 60 m	Eligible under D	No	Low-to-medium-density scatter of sherds, flaked and ground stone, shell; burials present	Phase I and II data recovery

TABLE 3.10-15 (CONTINUED)
Segment 4 Archaeological Sites in Arizona: NRHP Eligibility and Treatment Recommendations

Site Number	Land Status	Site Type	Cultural/ Temporal Affiliation	Approx. Size	Preliminary Assessment	Avoidance	Comments	Treatment
GR-1442	GRIC	Artifact scatter	Hohokam/ pre-Classic, Classic	160 x 45 m	Eligible under D	No	Low-density scatter of sherds, flaked and ground stone, subsurface deposits possible	Phase I data recovery
GR-1443/AZ T:12:16 (ASM)	GRIC	Features with no associated artifacts	Hohokam?	120 x 75 m	Eligible under D	Yes	Rock piles	Avoid
GR-1444	GRIC	Linear	Akimel O'Odham, Pee Posh/ Late Historic	20 ft (width)	Eligible under A	Yes	Diversion dike	Mitigative Documentation
GR-1082/ AZ T:12:80 (ASM)	GRIC	Features with no associated artifacts	Akimel O'Odham, Pee Posh/ Late Historic	250 x 100 ft	Eligible under A	Yes	Remains of pump station and related features	Avoid
GR-1083/ AZ T:12:79 (ASM)	GRIC	Features with no associated artifacts	Hohokam?	30 x 10 m	Eligible under D	No	Rock piles	Phase I data recovery

3.10.6 Ancillary Facilities

All facilities are included in the affected environment section for each segment.

3.10.7 Environmental Consequences

3.10.7.1 Proposed Action

The cultural resource survey recorded 116 sites. Eighty sites are recommended eligible to the NRHP. Tables 3-3, 3-6, 3-9, 3-12 and 3-15 provide avoidance options for each segment location. Of the 80 eligible sites, there are 4 sites in Segment 1, 33 sites in Segment 2, 17 sites in Segment 3 and 26 sites in Segment 4. Most of these sites consist of artifact scatter with features. The cultural affiliation most encountered in eligible sites is within the Archaic, Mogollon and Hohokam. When avoidance is not possible, data recovery in accordance with the approved treatment plan is recommended for each eligible site. Data recovery would be limited to the portion of the site within the ROW. Section 106 consultation is ongoing and would be completed before issuance of the Notice to Proceed and ROW grant.

A bridge that was recorded (Bridge No. 1705) is a steel stringer bridge built in 1930. The bridge is on NM 549 and crosses over the proposed ROW. It is one of the oldest railroad bridges in New Mexico and is an example of a railroad grade separation (Van Citters, 2003).

It is recommended eligible to the NRHP under Criteria A and C. No treatment is recommended since the pipeline goes under the bridge. Isolated occurrences have been fully recorded and no further work is recommended.

Of the projects listed in this cultural survey, several were surveys of the existing KMEP pipeline. The pipeline route was first surveyed in 1955, prior to line's original construction by the Southern Pacific; the portion of the route within which Segments 2, 3, and 4 are located was surveyed by McConville and Holzkamper (1955). They recorded no sites in Segment 2, but several in Segments 3 and 4. In the early 1990s, when the pipeline was operated by Santa Fe Pacific, Archaeological Consulting Services (ACS) surveyed portions of Segments 3 and 4, recording a number of prehistoric and historic sites (Crary, 1993; Crary and Macnider, 1992a; 1992b); ACS had previously surveyed the route of the Liberty to Coolidge transmission line that parallels a portion of the pipeline on the GRIC (Effland, 1984). Recent linear surveys that paralleled substantial portions of the present survey corridor were fiber optic surveys by SWCA along the El Paso Natural Gas (EPNG) pipeline that runs just south of the KMEP pipeline in Segment 2 (Tucker, 2000) and by Western Cultural Resource Management (WCRM) along the UPRR in the area of Segment 3 (Baker and Webb, 2001). In Segment 4, on GRIC land, the ASM Cultural Resource Management Division (CRMD) recently surveyed a power line, now abandoned, that was a component of the San Carlos Irrigation Project (SCIP); the line runs from 50 to 100 feet east of the existing KMEP pipeline south of the Gila; the 100-meter survey corridor for this project partially overlapped William Self and Associates' (WSAs') 60-meter corridor.

Other than linear projects, survey in the San Simon Valley in the area of Segment 2 has been limited; research-specific surveys have been conducted in the valley to the north (Gilman, 1997) and in the San Bernardino Valley to the south (Douglas, 1987). In the area of Segment 3, major surveys were done in the 1980s in association with the Central Arizona Project (CAP). The ASM Cultural Resource Management Division surveyed much of the northern Tucson Basin (Madsen et al., 1993) and from there north around the Picacho Mountains (Czaplicki, 1984; McCarthy, 1982); Northland Research surveyed through the Santa Cruz Flats for the Santa Rosa Canal (Marmaduke, 1993). The largest CAP-related surveys in the area of Segment 4 south of the GRIC was the Ak-Chin West Side Farms Project (Marmaduke et al., 1983). On GRIC lands, the P-MIP has resulted in large-scale surveys of the eastern portions of the community, but coverage of District 6 has been limited. The only large-scale reconnaissance of this area was the GRIC Archaeological and Historical Site Survey conducted by ASM in 1970-1972 (Ayres, 1975; Wood, 1972).

In terms of survey expectations, Segment 2 was known to have been, both prehistorically and historically, a sparsely populated, relatively peripheral area, as it is today. Although no Archaic sites have been recorded in the vicinity of Segment 2, their presence was considered a possibility; the type site for the Chiricahua phase is on Cave Creek, on the east side of the Chiricahuas (Sayles and Antevs, 1941). The distributional pattern of the few previously recorded prehistoric sites in the immediate vicinity of Segment 2 suggested that San Simon branch sites could be expected in the areas of mesquite coppice dunes by the river and that limited-activity sites might be present on the bajadas. Euro-American isolated refuse deposits, dating from the 1920s and later, also were expected.

In Segment 3, identification of Archaic sites was considered unlikely, because of the depth of deposition in the survey corridor. CAP-related surveys and other investigations had already documented the presence of Hohokam resource procurement/processing sites and at least four habitation sites in and near the survey corridor; one of these also was recorded as having an O'Odham component, as well. Euro-American railroad-related sites and isolated refuse deposits, dating from the 1880s and later, also were known to be present. This general pattern applied to Segment 4, with the significant addition of known large habitation sites on the Gila having Hohokam, Akimel O'Odham, and possibly Pee Posh components.

One concern in all three segments was the possible presence of remains related to the route across Arizona used by the San Antonio and San Diego Mail Line and the Overland Mail from 1857 to 1861 and by the post-Civil War stage and freight lines until the arrival of the railroad. The Overland Mail route crossed the Peloncillos north of Segment 2 and ran to San Simon Station, thence west-southwest across the valley to Apache Pass Station (Conkling and Conkling, 1947). A later route also is shown as "Overland Route" on the GLO plats surveyed in 1883; this route crossed the Peloncillos farther to the south, apparently through the same pass as the El Paso Natural Gas Company (EPNG) and KMEP lines. No trace of this was found during the survey.

Approaching Fort Bowie and Apache Pass, all routes converged (Ahern, 1973; Greene, 1980). During a survey of the EPNG pipeline in this area, a possible portion of one these routes was recorded as AZ CC:15:64; the portion was described as a very eroded trace measuring 6 by 500 feet (Jensen and Gage, 1994). During the present survey, WSA archaeologists looked for but could not identify any trace of these routes. SWCA's 1999 fiber optic survey along the EPNG pipeline also had sought but failed to locate any sign of the routes (David Tucker personal communication, 2004). The bajada here is dissected by numerous drainages and subject to considerable erosion.

In the southern portion of Segment 3, the Overland Mail route and the later stage and freight road ran on the east side of the railroad (Conkling and Conkling, 1947). The GLO plat surveyed in 1883 shows a road labeled "Tucson" in this general location. The plats surveyed in 1883 show only fragments of a road, presumably the remains of the of the Overland Mail route. WSA archaeologists looked for but found no trace of the route in the survey corridor. As noted above in the discussion of Register-listed properties, a portion of the route (approximately 0.5 mile) has been recently identified in Picacho Pass, along with the likely site of the Picacho Station and the area where the 1862 skirmish occurred, and has been designated AZ AA:7:502 (ASM) (Strader, 2002; Strader and Strader, 2000; Strader et al., 2000). The Overland Mail route continued through the pass, thence north to Bluewater and Oneida Station, thence northwest to Sacaton, Casa Blanca, and Maricopa Wells (AZ T:16:10 [ASM]), which is located 0.5 mile west of the Segment 4 survey corridor on the GRIC. Here, WSA identified a road that could be the actual Overland Mail route; this has been designated GR-1437 and is described below.

If any subsurface cultural materials are encountered during construction, all work should stop in the vicinity until a qualified archaeologist can assess the significance of the remains. An Emergency Discovery Plan conventional with the Advisory Council on Historic Preservation and accepted by applicable agencies such as the BLM, SHPOs and tribal agencies would be followed.

3.10.7.2 No Action Alternative

Under the No Action Alternative, no ground disturbing activities would occur for the proposed project areas. The No Action Alternative would have no immediate affect on any undiscovered resources, historic or cultural, that might be present. No mitigation would be required. However, continued aging of the existing pipeline could lead to increased maintenance activities that could impact cultural resources not previously impacted. Such activities could be in emergency situations that could lead to unforeseen impacts to cultural resources.

3.11 Visual Resources

The assessment of the visual impacts is based upon the degree of change in the existing visual character from the perspective of the roads and cities along the route. Visual resources include the following landscape components:

- Land forms
- Water features
- Vegetation types
- Land use
- Cultural modifications

From the perspective of the motorist along I-10, most of the pipeline route would be in the background, especially where the pipeline is hidden from the line of sight by the berm of the railroad track. From the perspective of the people living in cities along the route, the route would conform to the visual effects created by the existing pipeline. In areas where the route deviates from the existing pipeline, minimizing the removal of trees and shrubs would help to minimize the potential visual impact.

3.11.1 Affected Environment

3.11.1.1 Segment 1

Segment 1 follows existing pipeline corridors currently occupied by multiple El Paso Natural Gas and SFPP pipelines.

3.11.1.2 Segment 2

The proposed pipeline follows existing pipelines and runs parallel to the UPRR. The proposed pipeline also parallels and is adjacent to the I-10 corridor for the majority of Segment 2 except the beginning and end of the segment.

3.11.1.3 Segment 3

This segment runs entirely along and is adjacent to the I-10 corridor and the UPRR corridor, except for a 2-mile reroute that crosses I-10 to the Toltec Station.

3.11.1.4 Segment 4

The majority of Segment 4 passes through the GRIC and crosses the Gila River. This proposed segment follows the existing pipeline across uninhibited open desert except where it crosses the Town of Maricopa and UPRR property.

3.11.1.5 Ancillary Facilities

A new breakout facility would be located in the City of El Paso on Railroad Drive. This facility would be used for storage and pumping and would include:

- Maintenance building
- Electric building
- Control building
- Electric substation
- Storage tanks
- Shipping pumps
- Retention pond

New pipeline markers would be installed along the entire route as required by 49 CFR 195.410.

Cathodic protection test stations also would be installed (bolted/welded) onto the pipeline every mile according to regulations.

3.11.2 Environmental Consequences

3.11.2.1 Proposed Action

Short-term visual impacts during construction are expected due to ground disturbance; short-term contrasts in form, line, color, and texture; and increased traffic, especially of construction vehicles.

Long-term visual impacts are not expected as a result of the proposed route since the pipeline would be installed underground within existing roadway ROWs and along the railroad ROW.

New ancillary facilities such as the cathodic protection test stations and pipeline markers would create a visual mark. However, these facilities are necessary for the protection of the pipeline and safety of the surrounding environment.

The breakout facility in El Paso is within an industrially zoned area. No visual impacts are expected since aesthetics would be maintained by using colors consistent with the surrounding landscape.

3.11.2.2 No Action Alternative

Under the No Action Alternative, no pipeline expansion would occur and no ancillary facilities such as cathodic protection test stations and pipeline markers would be installed. The No Action Alternative would not alter the landscape from the present condition and would therefore not affect the current visual quality along any of the four segments of the proposed pipeline expansion. No mitigation would be required.

3.12 Noise

This section presents the potential effects of noise from the construction and operation of the project on the surrounding area.

3.12.1 Fundamentals of Acoustics

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. There are several different ways to measure noise, depending on the source of the noise, the receiver, and the reason for the noise measurement. In this subsection, some statistical noise levels are stated in terms of decibels on the A-weighted scale (dBA). Noise levels stated in terms of dBA reflect the response of the human ear by filtering out some of the noise in the low and high frequency ranges that the ear does not detect well. The A-weighted scale is used in most ordinances and standards. The equivalent sound pressure level (L_{eq}) is defined as the average noise level, on an energy basis, for a stated period of time (for example, hourly). In practice, the level of a sound source is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighted curve. The sound level meter also performs the calculations required to determine the L_{eq} for the measurement period.

Technical noise terms used in this report are summarized in Table 3.12-1.

TABLE 3.12-1
Definitions of Acoustical Terms

Term	Definitions
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the measured pressure to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
A-Weighted Sound Level, dB	The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted.
Equivalent Noise Level, L_{eq}	The energy average noise level during the measurement period.
Percentile Noise Level (L_n)	The noise level exceeded during n percent of the measurement period, where n is a number between 0 and 100 (e.g., L_{10} is the noise level exceeded 10 percent of the time).
Day-Night Noise Level (L_{dn} or DNL)	The average A-weighted noise level during a 24-hour day, obtained after the addition of 10 decibels to the noise levels from 10:00 p.m. to 7:00 a.m.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	Noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

The effects of noise on people can be listed in three general categories:

- Subjective effects of annoyance, nuisance, or dissatisfaction
- Interference with activities such as speech, sleep, or learning
- Physiological effects such as startling and hearing loss

In most cases, environmental noise produces effects in the first two categories only. However, workers in industrial plants may experience noise effects in the last category. No completely satisfactory method exists to measure the subjective effects of noise, or to measure the corresponding reactions of annoyance and dissatisfaction. This lack of standard is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise.

Table 3.12-2 shows the relative A-weighted noise levels of common sounds measured in the environment and in industry for various sound levels.

TABLE 3.12-2
Typical Sound Levels Measured in the Environment and Industry

Noise Source At a Given Distance	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
	140		
Civil Defense Siren (100 ft)	130		
Jet Takeoff (200 ft)	120		Pain Threshold
	110	Rock Music Concert	
Pile Driver (50 ft)	100		Very Loud
Ambulance Siren (100 ft)			
	90	Boiler Room	
Freight Cars (50 ft)		Printing Press Plant	
Pneumatic Drill (50 ft)	80	Kitchen With Garbage Disposal Running	
Freeway (100 ft)			
	70		Moderately Loud
Vacuum Cleaner (10 ft)	60	Data Processing Center	
Department Store			
Light Traffic (100 ft)	50	Private Business Office	
Large Transformer (200 ft)			
	40		Quiet
Soft Whisper (5 ft)	30	Quiet Bedroom	
	20	Recording Studio	
	10		Hearing Threshold

3.12.2 Affected Environment

The project would be designed and constructed in a manner that ensures compliance with federal, state, county and city laws and regulations.

Although there are no federal noise limits, guidelines are available from the USEPA (1974) to assist state and local government entities in development of state and local regulations for noise. The Federal Energy Regulatory Commission (FERC) has adopted these guidelines in their *Guidance Manual for Environmental Report Preparation* (August 2002) that states that the project must demonstrate that it "will comply with applicable noise regulations" and "must not exceed a day-night sound level (L_{dn}) of 55 dBA at any pre-existing noise-sensitive area." A L_{dn} of 55 dBA is equivalent to a continuous level of L_{eq} 49 dBA. It should be noted that the FERC manual was developed to provide guidance for natural gas projects, which have the potential to be very loud. FERC guidelines are not directly applicable to product pipelines.

Onsite noise levels are regulated, in a sense, through the OSHA. The noise exposure level of workers is regulated at 90 dBA, over an 8-hour work shift to protect hearing (29 CFR 1910.95). Onsite noise levels are anticipated to be in the 70- to 85-dBA range. Areas above 85 dBA would be posted as high noise level areas and hearing protection would be required.

The pipeline traverses through Texas, New Mexico and Arizona, none of which have regulations that limit industrial noise. What follows is a discussion of the local noise regulations that were determined applicable to this project. In the absence of local regulations, the project would be designed to comply with FERC guideline of 55 dBA L_{dn} (49 dBA L_{eq}) at existing noise-sensitive areas.

3.12.2.1 Segment 1

Segment 1 is located within the County of El Paso, Texas and Fort Bliss as shown in Figure 2.1-1. The noise regulations for El Paso are detailed in Chapter 9.40 of Title 9, Health and Safety, of the municipal code. The most restrictive limit to residential areas is 50 dBA between the hours 10:00 p.m. and 7:00 a.m. Noise sources associated with construction are exempt provided that they are not active between the hours of 8:00 p.m. and 7:00 a.m. on weekdays and Saturday or any time on Sunday or a holiday and do not exceed 65 dBA.

3.12.2.2 Segment 2

Segment 2 passes through Dona Ana, Luna, Grant, and Hidalgo Counties in New Mexico and Cochise County in Arizona as shown in Figures 2.1-2 and 2.1-3. Neither Dona Ana, Luna, nor Hidalgo County has regulations that limit noise levels. Grant County makes it unlawful to "disturb the peace" but exempts construction activities between 7:00 a.m. and 7:00 p.m. Cochise County does not have a noise ordinance but its zoning code does contain site development standards (Articles 12, 13 and 14) that apply to operational noise: "No noise or vibration (other than normal vehicular traffic) shall be permitted which is discernible on neighboring residential sites, to the unaided human senses for 3 minutes or more duration in any 1 hour of the day between the hours of 7:00 a.m. to 7:00 p.m. or of 30 seconds or more duration in any 1 hour during the hours of 7:00 p.m. and 7:00 a.m."

3.12.2.3 Segment 3

Segment 3 passes through Pima and Pinal Counties, Arizona as shown in Figure 2.1.-3. Neither Pima nor Pinal County has a noise ordinance. The Sheriff's Department is tasked with dealing with nuisance noise in Pinal County.

3.12.2.4 Segment 4

Segment 4 passes through Pinal and Maricopa Counties, Arizona as shown in Figure 2.1-3. Neither Pinal nor Maricopa County has a noise ordinance. The Sheriff's Department is tasked with dealing with nuisance noise in both counties.

3.12.2.5 Ancillary Facilities

The Tucson Terminal is in an industrial area located near Davis-Monthan Air Force Base (DMAFB). The most restrictive noise limit in residential areas is 62 dBA between the hours of 10:00 p.m. and 7:00 a.m. (Chapter 16.31, Tucson City Municipal Code). Construction activities conducted between sunrise and 8:00 p.m. Mondays through Saturdays (except legal holidays) is exempt from regulation.

The breakout station is located in the El Paso. The applicable regulations are summarized in above for Segment 1.

The Deming pump station is located in the City of Deming, New Mexico. Title 4 Chapter 2 of the City's Municipal Code establishes comprehensive noise limits, including frequency dependent criteria (refer to Table 3.12-3). Construction noise limits of 75, 80, and 85 dBA (L_{10}) are established for residential/institutional, business/recreational and industrial uses respectively. The limit applies at 50 feet from the construction equipment or the lot line, whichever is furthest.

TABLE 3.12-3
Noise Limits for the City of Deming, New Mexico

Octave Band Center Frequency (Hz)	Residential (7 a.m. to 6 p.m.)	Residential (6 p.m. to 7 a.m.)	Commercial (7 a.m. to 6 p.m.)	Commercial (6 p.m. to 7 a.m.)	Industrial (6 p.m. to 7 a.m.)	Industrial (7 a.m. to 6 p.m.)
31.5	76	68	79	72	79	83
63	75	67	78	71	78	82
125	69	61	73	65	73	77
250	62	52	68	57	68	73
500	56	46	62	51	62	67
1000	50	40	56	45	56	61
2000	45	33	51	39	51	57
4000	40	28	47	34	47	53
8000	38	26	44	32	44	50
Single Number Equivalent (dBA)	60	50	65	55	65	70

Source: Title 4, Chapter 2, City of Deming, New Mexico Municipal Code (http://66.113.138.216/sterlingcodifiers/NM/Deming/index.htm)

3.12.3 Environmental Consequences

3.12.3.1 Proposed Action

Construction Noise. Construction of the project is expected to start in the summer of 2005. The noise level would vary during the construction period, depending on the construction phase and number and location of operating construction equipment. Individual equipment noise levels typically used on similar heavy construction projects are presented in Table 3.12-4.

TABLE 3.12-4
Equipment Noise Levels on Heavy Construction Projects (dBA)

		Equipment type	Range in Noise Level at 50 ft
Equipment Powered by Internal Combustion Engines	Earth Moving	Front Loaders	72-84
		Backhoes	72-93
		Tractors	77-96
		Scrapers	80-93
		Graders	80-93
		Pavers	86-89
		Trucks	82-94
	Materials Handling	Concrete Mixers	75-88
		Concrete Pumps	81-84
		Cranes, Movable	75-88
		Cranes, Derrick	86-89
	Stationary	Pumps	68-72
		Generators	71-82
		Compressors	74-87
	Impact Equipment	Mounted Breakers (Hoerams)	76-94
		Pneumatic Wrenches	82-89
		Jackhammers & Rock Drills	81-98
		Impact Drivers (Peak)	95-106
	Other	Vibrator	69-81
		Saws	72-82

Source: Oregon Department of Transportation Noise Manual

Operational Noise. Noise sources associated with this project primarily include electrically driven pumps and valves. All pumps and valves are anticipated to comply with an 85 dBA at 3 feet specification. In general, the noise generated from this project is expected to be similar to the noise generated by the existing pipeline. There have been no noise complaints from the existing pipeline.

Segment 1 of the pipeline is located within a corridor that is currently used by multiple El Paso Natural Gas and SFPP pipelines. The El Paso pump station would be modified but no pump upgrade would be required. Therefore, the noise level associated with this segment is anticipated to be similar to existing levels.

The breakout station has several additional noise sources including a thermal oxidizer. Noise from the breakout station is anticipated to be similar in level with that of the neighboring wastewater treatment plant and food processing facility. Noise levels from the breakout station are predicted to be less than 40 dBA at the nearest residences; 10 dBA below the levels required for residential property by the City of El Paso. Figure 3.12-1 depicts the predicted noise levels generated by the breakout station.

Segment 2 of the pipeline follows an existing pipeline and generally parallels UPRR or I-10. The Lordsburg pump station would be upgraded to 16-inch-diameter pipe but would not require additional pumps. The noise level associated with this segment and the Lordsburg pump station is anticipated to be similar to existing levels. The Deming pump station would double the number of pumps from two to four, adding two 2,500-hp pumps and one control valve. The additional pumps are anticipated to be similar in noise level to the existing pumps and to comply with the 85 dBA at 3 feet specification. The resulting noise level from the Deming pump station is therefore anticipated to increase 3 dBA – generally considered the threshold of perception outside of laboratory setting.

Segment 3 of the pipeline follows the I-10 and/or UPRR corridor. The Toltec pump station would be upgraded to 16-inch-diameter pipe but would not require additional pumps. Therefore, the noise level associated with this segment is anticipated to be similar to existing levels.

The existing pumps at the Tucson Terminal would be replaced with two 2,500-hp pumps. In addition, outbound and inbound control valves would be added. The closest residential area is approximately 1 mile away. Given the industrial uses surrounding the Tucson Terminal and DMAFB to the east, the noise level associated with the new pumps is not anticipated to increase noise levels.

Segment 4 of the pipeline follows the existing pipeline except for a reroute around the Town of Maricopa. An alternative route would continue through town parallel to the existing pipeline. Noise from the alternative is anticipated to be similar to existing levels.

3.12.3.2 No Action Alternative

Under the No Action Alternative, no pipeline expansion would occur and no pump or breakout stations would be constructed. The Phoenix/Tucson region would continue to receive a large portion of their petroleum products via tanker truck. The potential environmental impacts, including noise, associated with hauling petroleum products by tanker truck would remain.

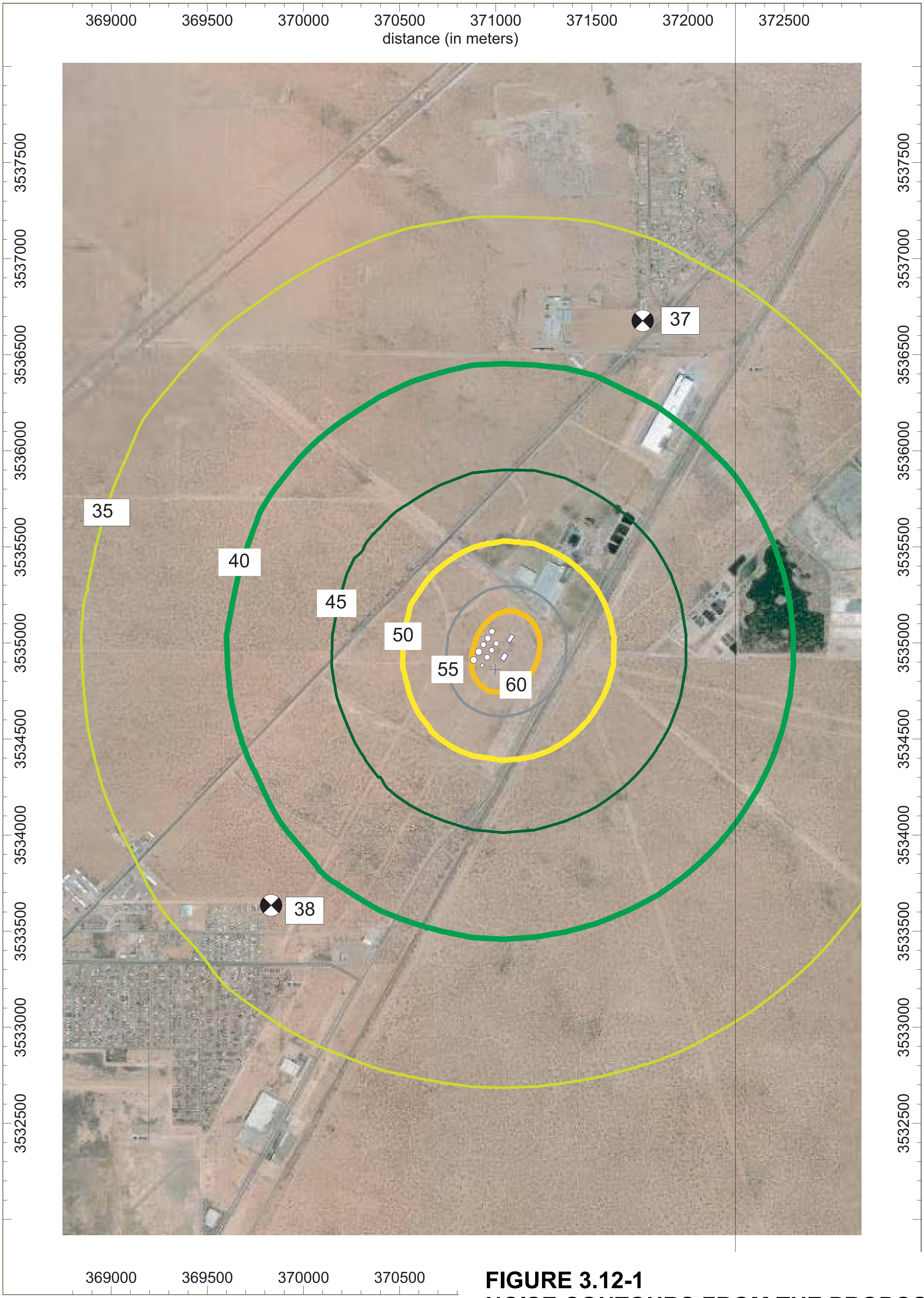


FIGURE 3.12-1
NOISE CONTOURS FROM THE PROPOSED BREAKOUT FACILITY (dBA)
EAST LINE EXPANSION PROJECT
ENVIRONMENTAL ASSESSMENT

CH2MHILL

3.13 Environmental Justice

This section was prepared in compliance with Presidential Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (EO 12898), dated February 11, 1994, and Title VI of the Civil Rights Act of 1964. The purpose of this section is to determine if the proposed project would have disproportionately high and adverse human health or environmental effects on minority and/or low-income populations. This analysis focuses on the populations located within the area potentially affected by the proposed project. In accordance with EO 12898, this analysis documents minority and low-income populations within El Paso County in Texas; Dona Ana, Grant, Hidalgo, and Luna Counties in New Mexico; and Conchise, Pima, Pinal, and Maricopa Counties in Arizona. In addition, this analysis also documents minority and low-income populations within the cities/communities of El Paso, Dona Ana, Vado, Deming, Lordsburg, Marana, Eloy, and Maricopa. After establishing the existence of minority and low-income populations within the study area, this section evaluates if there are disproportionately high and adverse impacts on these populations once all of the mitigation measures for the significant impacts have been implemented. This analysis also examines where the high and adverse impacts (as reported in the various environmental analysis sections of this EA) fall relative to these populations.

EO 12898, issued by President Clinton in 1994, requires that "each federal agency shall make achieving environmental justice (EJ) part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations…". In his memorandum transmitting EO 12898 to federal agencies, President Clinton further specified that, "each federal agency shall analyze the environmental effects, including human health, economic and social effects, of federal actions, including effects on minority communities and low-income communities, when such analysis is required by the National Environmental Policy Act of 1969." Guidance on how to implement EO 12898 and conduct an EJ analysis has been issued by the President's Council on Environmental Quality(CEQ) (CEQ, 1997).

Title VI of the Civil Rights Act of 1964 states that "No person in the United States shall, on the ground of race, color, or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance." Title VI bars intentional discrimination, but also unjustified disparate impact discrimination resulting from policies and practices that are neutral on their face (i.e., there is no evidence of intentional discrimination) but have the effect of discrimination on protected groups.

3.13.1 Affected Environment

Both EO 12898 and Title VI address persons belonging to the following target populations:

- Minority – all people of the following origins: Black, Asian, American Indian and Alaskan Native, Native Hawaiian or Other Pacific Islander, and Hispanic

- Low income – persons whose household income is at or below the U.S. Department of Health and Human Services poverty guidelines.

The U.S. Census Bureau provided a definition of minority and low-income populations. The term “minority population” includes persons who identify themselves as African American, Asian or Pacific Islander, American Indian or Alaskan Native, or Hispanic. Race refers to census respondents’ self-identification of racial background. Hispanic origin refers to ethnicity and language, not race, and may include persons whose heritage is Puerto Rican, Cuban, Mexican, or Central or South American. Low-income populations were identified as populations that are below the poverty line (as established by the U.S. Department of Health and Human Services poverty guidelines). The U.S. Census Bureau does not provide a specific definition for “low income.” Rather, the term is used interchangeably with “poverty” (USEPA, 2000). For this analysis, low-income populations were identified using the Census Bureau’s ratio of income in 1999 to poverty level. Individuals whose income to poverty ratios are below 1 are considered low income.

The proportion of low income, minority, and Hispanic populations was calculated for each of the counties and cities/communities to determine whether the project would cause a “disproportionately high and adverse” impact to either minority or low-income populations. The following sections present data on minority, Hispanic, and low-income populations by segment.

3.13.1.1 Segment 1

The majority of Segment 1 is located in El Paso County, within the Fort Bliss Military Reservation adjacent to the City of El Paso, Texas. As the numbers in Table 3.13-1 show, the population of the City of El Paso is predominantly Hispanic (76.7 percent of the total population). However, most of the Hispanic population in the city also is white (74.1 percent of the total population). About 22 percent of the population in the City of El Paso is low income (Table 3.13-2). The proposed project ROW is not located near any residential or public use area.

TABLE 3.13-1
Segment 1, Racial and Ethnic Distribution of Population, 2000 Census

Area	Population	White	Black	Amer. Indian	Asian	Hawaiian	Other[a]	Hispanic[b]
El Paso County	679,622	74.1%	3.0%	0.7%	1.0%	0.1%	21.0%	78.3%
El Paso City	564,280	73.5%	3.1%	0.7%	1.2%	0.1%	21.4%	76.7%
Rest of County	115,342	76.9%	2.8%	0.6%	0.3%	0.0%	19.3%	86.2%
State of Texas	5,130,632	75.5%	3.0%	4.9%	1.8%	0.1%	14.7%	25.2%

[a] Other includes the “Two or more races” category.

[b] Hispanic origin refers to ethnicity and language, not race, and may include persons whose heritage is Puerto Rican, Cuban, Mexican, or Central or South American.

Source: U.S. Department of Commerce (DOC), 2004.

TABLE 3.13-2
Segment 1, Distribution of Low-Income Population, 2000 Census

Area	Population for Whom Poverty Is Determined	Low-Income Population	Percent Low-Income Population
El Paso County	666,676	158,722	23.8%
El Paso City	558,932	124,281	22.2%
Rest of County	107,744	34,441	32.0%
State of Texas	20,287,300	3,117,609	15.4%

Source: USDOC, 2004.

3.13.1.2 Segment 2

Segment 2 would pass through the New Mexico Counties of Dona Ana, Luna, Grant, and Hidalgo, and a portion of Cochise County, Arizona. In New Mexico, the cities of Deming and Lordsburg, and the communities of Dona Ana and Vado are the only populous areas near the proposed ROW. With the exception of the community of Dona Ana, all of the communities and counties in this segment have a white population that comprises more than 51 percent. In the community of Dona Ana, the population breakdown is Other (52.1 percent), White (45.9 percent), and Black (1.9 percent). As Table 3.13-3 shows, this segment is characterized by high Hispanic populations—only Grant County (NM) and Cochise County (AZ) have less than 50 percent Hispanic population. Both of these counties are predominately white—Grant County is 75.7 percent White and Cochise County is 76.5 percent White. The table also shows the racial/ethnic distribution for the states of New Mexico and Arizona.

As shown in Table 3.13-4, the low-income populations within this segment range from a high of 34 percent (in the community of Vado, NM) to a low of 17.7 percent (in Cochise County, AZ). For comparison purposes, the table also shows the distribution of low-income population in the states of New Mexico and Arizona.

TABLE 3.13-3
Segment 2, Racial and Ethnic Distribution of Population, 2000 Census

Area	Population	White	Black	Amer. Indian	Asian	Hawaiian	Other[a]	Hispanic[b]
Dona Ana County, NM	174,682	67.9%	1.4%	1.4%	0.8%	0.1%	28.4%	63.4%
Dona Ana CDP[c]	1,500	45.9%	1.9%	0.0%	0.0%	0.0%	52.1%	85.1%
Vado CDP[3]	3,065	51.2%	1.3%	1.0%	0.0%	0.0%	46.4%	97.7%
Rest of County	170,117	68.4%	1.4%	1.5%	0.8%	0.1%	27.9%	62.6%
Luna County, NM	25,016	74.4%	0.7%	1.4%	0.3%	0.0%	23.2%	57.9%
Deming City	14,238	68.8%	0.9%	1.8%	0.5%	0.0%	28.0%	66.1%
Rest of County	10,778	81.9%	0.4%	0.9%	0.1%	0.0%	16.8%	47.0%
Grant County, NM	31,002	75.7%	0.6%	1.2%	0.3%	0.1%	22.1%	48.9%
Hidalgo County, NM	5,932	84.6%	0.2%	0.6%	0.1%	0.0%	14.5%	56.3%
Lordsburg City	3,381	81.9%	0.3%	0.4%	0.1%	0.0%	17.4%	75.1%
Rest of County	2,551	88.1%	0.2%	0.9%	0.1%	0.0%	10.7%	31.3%
Cochise County, AZ	117,755	76.5%	4.3%	1.3%	1.7%	0.2%	15.9%	30.7%
State of New Mexico	1,819,046	66.8%	1.8%	9.5%	1.0%	0.1%	20.8%	42.1%
State of Arizona	20,851,820	71.0%	11.4%	0.5%	2.7%	0.1%	14.3%	32.0%

[a] Other includes the "Two or more races" category.
[b] Hispanic origin refers to ethnicity and language, not race, and may include persons whose heritage is Puerto Rican, Cuban, Mexican, or Central or South American.
[c] CDP = Census Designated Place

Source: USDOC, 2004.

TABLE 3.13-4
Segment 2, Distribution of Low-Income Population, 2000 Census

Area	Population for Whom Poverty Is Determined	Low-Income Population	Percent Low-Income Population
Dona Ana County, NM	169,559	43,054	25.4%
Dona Ana CDP[a], NM	1,500	342	22.8%
Vado CDP[a], NM	3,065	1,041	34.0%
Rest of County	164,994	41,671	25.3%
Luna County, NM	24,741	8,129	32.9%
Deming City, NM	13,970	4,600	32.9%
Rest of County	10,771	3,529	32.8%
Grant County, NM	30,365	5,676	18.7%
Hidalgo County, NM	5,838	1,591	27.3%
Lordsburg City, NM	3,287	1,074	32.7%
Rest of County	2,551	517	20.3%
Cochise County, AZ	111,867	19,772	17.7%
State of New Mexico	1,783,907	328,933	18.4%
State of Arizona	5,021,238	698,669	13.9%

[a] CDP = Census Designated Place

Source: USDOC, 2004.

3.13.1.3 Segment 3

Segment 3 is located entirely in Arizona. The majority of Segment 3 is located within Pinal County, with a small portion in Pima County. The portion of Segment 3 from Picacho to Tolec is the only portion of this segment that passes through a populous area. Eloy, located between Picacho and Tolec, is the most populated area through which the pipeline passes. The Town of Marana is another populated area that is close to the pipeline route. According to the 2000 Census, the populations of both counties are predominantly White (75 percent for Pima and 71 percent for Pinal). Hispanics account for 30 percent and 29 percent, respectively, of the populations of Pinal and Pima Counties. The population in the City of Eloy is more than half White (53 percent); whereas, that in Marana is predominantly White (82 percent). Hispanics account for 74 percent and 18 percent of the populations in the City of Eloy and the Town of Marana, respectively. Table 3.13-5 shows the racial and ethnic distribution of the populations in Segment 3.

TABLE 3.13-5
Segment 3, Racial and Ethnic Distribution of Population, 2000 Census

Area	Population	White	Black	Amer. Indian	Asian	Hawaiian	Other[a]	Hispanic[b]
Pima County, AZ	843,746	75.0%	2.9%	3.3%	2.0%	0.1%	16.7%	29.4%
Marana Town	13,443	81.7%	2.7%	2.3%	2.5%	0.0%	10.8%	18.1%
Rest of County	830,303	74.9%	2.9%	3.3%	2.0%	0.1%	16.8%	29.6%
Pinal County, AZ	179,727	70.5%	2.7%	7.4%	0.6%	0.1%	18.7%	29.9%
Eloy City	10,307	52.7%	5.9%	3.3%	0.9%	0.1%	37.1%	73.8%
Rest of County	169,420	71.6%	2.5%	7.6%	0.5%	0.1%	17.6%	27.3%
State of Arizona	20,851,820	71.0%	11.4%	0.5%	2.7%	0.1%	14.3%	32.0%

[a] Other includes the "Two or more races" category.

[b] Hispanic origin refers to ethnicity and language, not race, and may include persons whose heritage is Puerto Rican, Cuban, Mexican, or Central or South American.

Source: USDOC, 2004.

About 32 percent of the population of Eloy and 17 percent of the population of Marana are low income. Table 3.13-6 shows the distribution of low-income population in Segment 3.

TABLE 3.13-6
Segment 3, Distribution of Low-Income Population, 2000 Census

Area	Population for Whom Poverty Is Determined	Low-Income Population	Percent Low-Income Population
Pima County, AZ	823,638	120,778	14.7%
Marana town	12,983	810	6.2%
Rest of County	810,655	119,968	14.8%
Pinal County, AZ	164,506	27,816	16.9%
Eloy city	8,762	2,796	31.9%
Rest of County	155,744	25,020	16.1%
State of Arizona	5,021,238	698,669	13.9%

Source: USDOC, 2004.

3.13.1.4 Segment 4

The majority of Segment 4 is located within Pinal County, Arizona with a small portion of the northern end reaching into southern Maricopa County, Arizona. The community of Maricopa contains the largest concentration of people near the proposed project area.

According to the 2000 Census, the populations of Pinal and Maricopa Counties are predominantly White (70.5 percent in Pinal and 77.3 percent in Maricopa). Whites account for about 59 percent of the population in the community of Maricopa. Hispanics represent 30 percent and 25 percent of the populations of Pinal and Maricopa Counties, respectively. The majority (78.5 percent) of the residents of the community of Maricopa is Hispanic. The area surrounding the community of Maricopa consists of the GRIC. Most of the proposed ROW passes through the GRIC land on this segment. Table 3.13-7 shows the racial and ethnic distribution of the populations along the pipeline route in Segment 4.

TABLE 3.13-7
Segment 4, Racial and Ethnic Distribution of Population, 2000 Census

Area	Population	White	Black	Amer. Indian	Asian	Hawaiian	Other[a]	Hispanic[b]
Pinal County, AZ	179,727	70.5%	2.7%	7.4%	0.6%	0.1%	18.7%	29.9%
Maricopa CDP[c]	1,080	59.4%	2.1%	4.5%	0.0%	0.0%	34.0%	78.5%
Rest of County	178,647	70.5%	2.7%	7.4%	0.6%	0.1%	18.6%	29.6%
Maricopa County, AZ	3,072,149	77.3%	3.6%	1.8%	2.2%	0.1%	15.0%	24.8%
State of Arizona	20,851,820	71.0%	11.4%	0.5%	2.7%	0.1%	14.3%	32.0%

[a] Other includes the “Two or more races” category.

[b] Hispanic origin refers to ethnicity and language, not race, and may include persons whose heritage is Puerto Rican, Cuban, Mexican, or Central or South American.

[c] CDP = Census Designated Place

Source: USDOC, 2004.

About 17 percent and 12 percent of the population in Pinal and Maricopa Counties are low income. The proportion of low-income population within the community of Maricopa is 23 percent. Table 3.13-8 shows the distribution of low-income population in Segment 4.

TABLE 3.13-8
Segment 4, Distribution of Low-Income Population, 2000 Census

Area	Population for Whom Poverty Is Determined	Low-Income Population	Percent Low-Income Population
Pinal County, AZ	164,506	27,816	16.9%
Maricopa CDP[a]	1,048	245	23.4%
Rest of County	163,458	27,571	16.9%
Maricopa County, AZ	3,027,299	355,668	11.7%
State of Arizona	20,287,300	3,117,609	15.4%

[a] CDP = Census Designated Place

Source: USDOC, 2004.

3.13.1.5 Ancillary Facilities

There would be no ancillary facilities installed near any residential areas. The breakout facility in Segment 1 would be located in an open area next to an industrial building. Any proposed scraper or pump stations would be located along the ROW well away from any populous areas.

3.13.2 Environmental Consequences

The EJ impacts were evaluated with regard to the minority, Hispanic, and low-income populations within each segment. Definitions of minority and low-income areas were established on the basis of the CEQ's *Environmental Justice Guidance Under the Environmental Policy Act* of December 10, 1997. CEQ's *Guidance* states that "minority populations should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) the population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis." The CEQ further adds that "The selection of the appropriate unit of geographical analysis may be a governing body's jurisdiction, a neighborhood, a census tract, or other similar unit that is chosen so as not to artificially dilute or inflate the affected minority population."

The CEQ guidelines do not specifically state the percentage considered meaningful in the case of low-income populations. For this study, the assumptions set forth in the CEQ guidelines for identifying and evaluating impacts on minority populations are used to identify and evaluate impacts on low-income populations.

Potential EJ impacts are assumed to occur in an area if the percentage of minority, Hispanic, and low-income populations is meaningfully greater than the percentage of minority, Hispanic, and low-income populations in the general population. For the following analysis, potential EJ impacts are assumed to occur if the percentage of minority, Hispanic, and low-income population within the counties is at least 10 percentage points greater than that of the general population in the state. Similarly, potential EJ impacts are assumed to occur if the percentage of the EJ population in the cities/communities is at least 10 percentage points greater than that of the respective counties.

3.13.2.1 Proposed Action

Segment 1. No EJ issues have been identified in direct relation to implementation of the Proposed Action within Segment 1. The proportion of minority, Hispanic, and low-income populations within both the City of El Paso and the El Paso County is less than 10 percentage points greater than those of the El Paso County and the State of Texas, respectively.

Segment 2. Segment 2 has proportions of minority, Hispanic, and low-income populations that are at least 10 percentage points greater than those observed at the county or state level. For instance, the proportion of minority population in the communities of Dona Ana (54 percent) and Vado (49 percent) is significantly higher than that for Dona Ana County (32 percent). Similarly, the proportion of Hispanics in the cities/communities of Dona Ana, Vado, Deming, and Lordsburg is larger than those of the respective counties of Dona Ana, Luna, and Hidalgo (see Table 3-13.3) while the proportion of Hispanics in the Counties of

Dona Ana, Luna, and Hidalgo is significantly larger than those in the State of New Mexico. Only Luna County has a percentage of low-income population (33 percent) that is larger than that of the state of New Mexico (18.4 percent). Thus, there is the potential for EJ issues with the implementation of the Proposed Action within Segment 2. However, the proposed project would follow existing ROWs and construction activities in populated areas would be completed quickly and cause minimal disturbances. As such, the Proposed Action would have no disproportionately high and adverse human health or environmental effects on minority, Hispanic, and/or low-income populations.

Segment 3. Segment 3 has proportions of minority, Hispanic, and low-income populations that are at least 10 percentage points greater than those observed at the county or state level. The City of Eloy has minority, Hispanic, and low-income populations that are significantly higher than those observed for Pinal County. The Town of Marana's Hispanic population is significantly higher than that in Pima County. Thus, there is the potential for EJ issues with the implementation of the Proposed Action within Segment 3. However, the proposed project would follow existing ROWs and construction activities in populated areas would be completed quickly and cause minimal disturbances. As such, the Proposed Action would have no disproportionately high and adverse human health or environmental effects on minority, Hispanic, and/or low-income populations.

Segment 4. The proportion of minority and Hispanic population in the community of Maricopa is significantly higher than that for Pinal County. Thus, there is the potential for EJ issues with the implementation of the Proposed Action within Segment 4. However, the proposed project would follow existing ROWs and construction activities in populated areas would be completed quickly and cause minimal disturbances. As such, the Proposed Action would have no disproportionately high and adverse human health or environmental effects on minority, Hispanic, and/or low-income populations.

Conclusion. Resource areas with potential for high and adverse human health or environmental impacts that have been evaluated in this study are: air quality, hydrology and water quality, and noise. Resource authors indicate that all impacts would be mitigated to below significance levels. Additionally, the proposed project would follow existing ROWs and construction activities in populated areas would be completed quickly and cause minimal disturbances. As such, the Proposed Action would have no disproportionately high and adverse human health or environmental effects on minority, Hispanic, and/or low-income populations.

3.13.2.2 No Action Alternative

Under the No Action Alternative, no pipeline expansion would occur with the proposed project areas. Health and environmental conditions in any minority, Hispanic, and/or low-income communities would remain unchanged from current conditions. The No Action Alternative would have no disproportionately high and adverse human health or environmental effects to low-income populations.

3.14 Socioeconomics

For the purposes of the EA process, socioeconomic conditions include the short-term socioeconomic effects of the project during construction. The long-term socioeconomic effects consider, at the population or community level, the following:

- The quality of life or "way of life"
- The economy, commercial opportunities, or employment
- The availability of recreational opportunities or amenities
- Home life or personal security
- Future land uses
- Impacts to minority and low-income groups

3.14.1 Short-Term Socioeconomic Impacts

Construction of the proposed project would represent a sizeable total investment in material and labor expenditures in each of the states and individual counties where pipeline segments are constructed. Preliminary estimates of costs are shown below in Tables 3.14-1 to 3.14-3.

TABLE 3.14-1
Costs Per County

Material Per County	Labor Per County	County	State
$1,060,000	$3,187,500	El Paso	Texas
$17,000,000	$18,350,000		El Paso Station and Breakout Facility
$4,258,500	$6,918,660	Dona Ana	New Mexico
$8,767,500	$14,244,300	Luna	New Mexico
$3,022,000	$2,298,000		Deming Booster Station
$3,006,000	$4,883,760	Grant	New Mexico
$5,511,000	$8,953,560	Hidalgo	New Mexico
$3,507,000	$5,697,720	Cochise	New Mexico
$167,085	$386,933	Pima	Arizona
$3,228,000	$2,618,000		Tucson Terminal
$3,174,615	$7,351,382	Pinal*	Arizona
$2,675,493	$6,195,588	Pinal*	Arizona
$1,092,807	$2,530,597	Maricopa	Arizona
$1,910,000	$1,790,000		Phoenix Terminal
$58,380,000.00	$85,406,000.00		

Note:
* Pinal County's costs were divided on a per-segment basis. Total material costs are $5,850,108. Total labor costs are $13,546,970.

TABLE 3.14-2
Costs Per State

Material	Labor	State
$1,060,000	$3,187,500	Texas
$25,050,000	$40,698,000	New Mexico
$7,110,000	$16,464,500	Arizona
$33,220,000.00	$60,350,000.00	

TABLE 3.14-3
Costs Per Segment

Segment	Material	Labor
Segment 1	$1,060,000	$3,187,500
Segment 2	$25,050,000	$40,698,000
Segment 3	$3,341,700	$7,738,315
Segment 4	$3,768,300	$8,726,185
	$33,220,000.00	$60,350,000.00

The project would employ specialized outside and possibly some local labor in each segment during the construction phase. This would generate additional employment and local spending during this period of time. The amount of local and outside labor used for constructing each segment is not known at this time, but specialized non-local personnel are usually employed for such projects. A sector-by-sector economic "multiplier" analysis, such as the U.S. Bureau of Economic Analysis' Regional Input-Output Multipliers (RIMS), has not been performed at this time, but the overall impacts to employment and aggregate personal incomes in each of the states and specific counties where construction occurs would be positive and is assumed to be higher during the pipeline construction period. The typical direct-effect construction sector employment multiplier has been estimated by past studies in Arizona using RIMS and the Arizona State University Business Outlook Center to be greater than 2.5 for the State of Arizona. This means that full-time equivalent (FTE) of construction employment is estimated to generate more than 2.5 jobs throughout the economy, per the statewide multipliers for RIMS II.

The construction phase also would generate additional sales and ad valorem taxes, where applicable, income taxes in each of the states where construction occurs. These additional state and local revenues can be considered additional revenues that would not occur in the absence of this project.

Construction of the proposed project also would require purchase of a total of 233.2 miles of easements currently held by private entities, states, and the federal government at an estimated cost of $4.23 million. It is estimated that purchases would include 6.2 miles of easements in Segment 1; 161 miles in Segment 2; 31.2 miles in Segment 3; and 34.8 miles in Segment 4. Fair market prices are expected to be paid for easements. The overall short-term impact of the construction of the proposed project is expected to be positive due to additions to state and local area incomes, tax revenues, and temporary employment.

Since the funding to build the project comes from private industry resources that would otherwise not be spent in these local area, the employment, earnings, and other impacts are therefore truly 'new' to the local and regional economies.

3.14.2 Long-Term Socioeconomic Impacts

The purpose of the proposed pipeline is to aid the region's municipalities in securing additional petroleum sources for the rapidly growing population. **This expansion would increase pipeline capacity by approximately 53,000 barrels per day on the El Paso to Tucson segment, and by approximately 44,000 barrels per day on the Tucson to Phoenix segment.** The state of Arizona has one of the fastest population growth rates among the 50 states for the last 50 years. Most of the growth is within the metropolitan Phoenix and Tucson areas, which is known as the Phoenix-Tucson metropolitan corridor. Approximately 80 percent of Arizona's population of 5 million people live in the Phoenix-Tucson metropolitan corridor (USGS, 2001). According to a market summary produced by Parkway Properties, Inc., the population growth in Phoenix alone has approximated 95,000 people a year since 1990.

The state uses about 7.3 million gallons (173,000 barrels) of gasoline per day. A little under 5 million gallons (110,000 barrels) are used in Maricopa County alone. For the foreseeable future, economic stability and growth depends on affordable, reliable, and safe supplies of both energy (fuel and electricity) and water. Arizona is in a delicate position due to the scarcity of water and the lack of crude oil production or gasoline refining in the state. Availability and affordability of gasoline is crucial for all citizens, especially those on fixed incomes and those workers with incomes lower than the national average.

Depending on future gasoline demands in the markets serviced by the pipeline, an increase in gasoline supply may create a more stable, or possibly even lower, price environment for wholesale and retail purchasers of gasoline. The new pipeline also would mitigate impacts to potential, temporary supply disruptions such as the temporary supply reductions seen in Maricopa County in June 2003.

3.14.3 Other Long-Term Impacts

Employment. It is currently estimated that nine new full-time positions would be created in the El Paso area as a result of higher operating and maintenance requirements from the new pipeline. These employees would generate additional secondary spending in the local economy through purchases of housing, food, and other commodities and services in the local economy.

Quality of Life. An increased supply of gasoline to the markets served by the new pipeline may ameliorate annual, cyclical changes to gasoline prices at the wholesale and retail levels. All else equal, a higher supply of gasoline may create an environment of lower gasoline prices, although this cannot be determined or assured in advance due to the uncertainties of future local and national gasoline market conditions. The negative feature of increased gasoline supply may be increased storage requirements and, through lower prices, higher per-capita consumption levels, both of which would require environmental monitoring and potential remediation.

Economy, Commercial Opportunities, and Employment. Since gasoline is one of the key inputs to all U.S. economies, a stable, increased supply at a potentially lower price would act as a reduction in the effective cost of business input costs. This would increase consumption by both consumers and business. To the extent that gasoline is considered more secure and potentially price competitive, business competitiveness would be enhanced. Lower input costs for business would enable a higher level of transactions, which may increase employment levels. A potentially lower price of gasoline would enable more travel to rural areas, which would clearly benefit those regions.

Availability of Recreational Opportunities. An increased supply of gasoline would not have a major impact on recreational opportunities, except that at a potentially lower price per gallon, residents would have an added incentive to travel to state recreational areas that are in rural locations.

Home Life and Personal Security. Increased regional gasoline supplies may not noticeably affect these aspects.

Future Land Uses. New land requirements for gasoline storage facilities may be required. A potentially negative impact of a higher supply (and potentially lower prices for gasoline) is that marginally lower transportation costs could promote suburban sprawl.

Impacts to Minority and Low-Income Groups. A higher supply of gasoline may provide a small benefit to these groups through potentially lower costs for transportation. Negative impacts to these groups have not been identified.

3.15 Cumulative Effects

3.15.1 Proposed Action

Implementation of the Proposed Action, along with past, present, and reasonably foreseeable actions, would have no adverse cumulative effects on the resources described in Section 3. Any effects to resources would occur during construction activities and would therefore be temporary, with the exception of cultural resources. Some unavoidable cultural resources would be permanently impacted and mitigation measures have been recommended to preserve the integrity of those resources. After pipeline installation, the ROW would be allowed to return to a natural state. No disturbances would take place as a result of operating the pipeline once it has been installed.

An exception to this would occur at the ancillary facilities such as the breakout facility. Facilities such as this would be permanent structures but would not impact the surrounding area as a result of operating each facility. The installation of ancillary facilities associated with this project would have no adverse effects on resources described in this document.

3.15.2 No Action Alternative

Under the No Action Alternative, replacement of approximately 233.2 miles of pipeline between El Paso and Phoenix would not occur nor would the installation of any associated ancillary facilities occur. SFPP's East Line would continue to operate in its current state, which would not meet the purpose and needs outlined in Section 1.2.

The SFPP East Line, in its current state, would not be able to meet the increasing demands of the Phoenix/Tucson region. The Phoenix/Tucson region is expected to experience continued rapid growth. To keep up with the increased demand in petroleum products, the use of tanker trucks to haul products would need to increase. This increase in truck traffic poses greater threats to people and the environment and would result in a less reliable supply of petroleum products.

Pipelines are distinguished as the safest and most economical method of transporting large quantities of petroleum products across great distances. Pipelines have a better safety record than other methods of transporting petroleum products, especially in relation to hauling by trucks. During the period between 1997 and 2000, truck incidents resulted in over 100 times more deaths, over 30 times more injuries, and over 45 times more fires and/or explosions than pipelines (Allegro Energy Consulting, 2003). Over the past 34 years, pipeline incidents (spills or other safety incidents) have seen a decrease of about 60 percent, despite an increase of 42 percent in the amount of petroleum product transported (Allegro Energy Consulting, 2003). The increased truck traffic, resulting from implementation of the No Action Alternative, may potentially have some serious long-term negative effects on the people and environment along the transport route due to the increased risk of accidents.

In addition to the increased risk of accidents, the increased truck traffic would result in higher levels of air pollution throughout the region. Highway vehicle emissions account for the majority of air pollution. Diesel exhaust, which is used by large transportation trucks, ranks among the air pollutants that the USEPA believes to pose the greatest health risk.

The Phoenix/Tucson region is expected to experience continued unprecedented growth, which would place added pressure on municipalities to provide adequate services. With the selection of the No Action Alternative, the current supply of petroleum products would have to satisfy the increasing demands of this growing population. Price increases of petroleum products based on demand/supply interactions would not be alleviated under the No Action Alternative.

Under the No Action Alternative, the use of tanker truckers would continue and ultimately increase to provide adequate petroleum supplies to a rapidly increasing population. Potential environmental impacts associated with hauling petroleum products by tanker trucks would increase as a result. These impacts include air pollution, possible spillage and other traffic accidents during hauling, noise pollution due to truck traffic, and wear on highways and roads caused by repetitive truck passage.

3.16 Mitigation Measures

All mitigation measures or BMPs listed in Section 2 (see Table 2-3.1) would be implemented as part of the Proposed Action to minimize any potential impacts to resources. These BMPs include practices to minimize impacts to soil and water, vegetation, wildlife, air, and the human environment. Practices also would be implemented to minimize the spread of noxious weeds within the project areas. These BMPs would be incorporated in the construction plan as a proactive way of minimizing any potential impacts to the environment as a result of this project.

Mitigation measures have been recommended for the impacts to cultural resources within the project area that cannot be avoided. Unavoidable cultural sites would undergo data recovery in the areas of potential affect prior to construction. Where feasible, cultural resources would be avoided by narrowing construction activities around the site or boring underneath the site. If any subsurface cultural materials are encountered during construction, all work should stop in the vicinity until a qualified archaeologist can assess the significance of the remains. An Emergency Discovery Plan conventional with the Advisory Council on Historic Preservation and accepted by applicable agencies such as the BLM, SHPOs and tribal agencies would be followed.

3.17 Summary of Impacts

Table 3.17-1 summarizes the determination of potential impacts to resources discussed in this EA.

TABLE 3.17-1
Summary of Impacts

Resource	Impact
Land Use	Short-term impacts during construction. No long-term impacts.
Recreation	Short-term impacts during construction. No long-term impacts.
Geology and Soils	Short-term impacts during construction. No long-term impacts.
Hydrology and Water Quality	Potential short-term impacts in the event that groundwater is encountered during excavation. No long-term impacts.
Floodplains and Waters of the United States	Would not affect the function of any waterways.
Biological Resources	
Vegetation	Direct effect to vegetation within the construction ROW but allowed to return to natural state after construction is completed.
Wildlife and Wildlife Habitats	May directly affect individuals by displacing wildlife within the ROW but would not adversely affect species as a whole.
Special Status Species	
Cactus ferruginous pygmy-owl	No direct effect to individuals but may have direct effect on potentially suitable breeding and dispersal habitat in the form of construction activities. Potential effects would only occur during construction activities.
Northern aplomado falcon	No direct effect to individuals. May have indirect effect on potential breeding and foraging habitat during construction.
Western burrowing owl	No direct effect to individuals. May have indirect effects on potential habitat or nearby burrowing owls during construction.
Jaguar	The Proposed Action would have no direct effects on individual jaguars. The Proposed Action may have an indirect effect on foraging behavior of jaguars by displacing prey species during construction.
Lesser long-nosed bat	No direct effect to individuals. May have indirect effect on foraging behavior during construction.
Cave myotis	No direct effect to individuals. May have indirect effect on foraging behavior during construction.
Mexican long-nosed bat	No direct effect to individuals. May have indirect effect on foraging behavior during construction.
Mexican long-tongued bat	No direct effect to individuals. May have indirect effect on foraging behavior during construction.
Western small-footed myotis	No direct effect to individuals. May have indirect effect on foraging behavior during construction.

TABLE 3.17-1 (CONTINUED)
Summary of Impacts

Resource	Impact
California leaf-nosed bat	No direct effect to individuals. May have indirect effect on foraging behavior during construction.
Desert tortoise	No direct effect to individuals. May have indirect effect on foraging behavior of individuals potentially roaming in the area during construction.
Texas horned lizard	No direct effect to individuals. May have indirect effect by impacting potential habitat.
Acuna cactus	No direct effects to individuals. May have indirect effect by impacting potential habitat.
Sand prickly-pear cactus	No direct effects to individuals. May have indirect effect by impacting potential habitat.
Air Quality	Impacts for each segment would be negligible and short-term. Impacts would primarily take the form of fugitive dust during construction activities.
Historic and Cultural Resources	Direct effects to unavoidable cultural resources. Impacts mitigated through data recovery.
Visual Resources	Short-term impacts during construction in the form of construction equipment. No long-term impacts.
Noise	Similar to existing noise levels after construction.
Environmental Justice	No disproportionately high or adverse effects on minority and/or low-income populations.
Socioeconomics	Positive short- and long-term impacts.

SECTION 4.

List of Preparers

SECTION 4

List of Preparers

Name	Field
Afamia El-Nakat, Ph.D.	Environmental and Archeology
Bill Self	Archaeology
Ed Russo	Station Engineering and Construction
Fatuma Yusuf, Ph.D.	Environmental Justice
Gabe Valdes	Biology
George Ring	Geology and Hydrology
Howard Higgins	Archaeology
Hugo Guerrero	Pipeline Engineering and Construction
Jay Vanlandingham	Geology and Hydrology
Kent Ennis	Socioeconomics
Marjorie Eisert	Permitting and Section 404
Mark Bastasch	Noise
Mark Cochran	Biology
Prabhat Bhargava	Air Quality
Regan Giese, R.P.A	Permitting and Archeology
Russell Huddleston	Floodplains and Waters of the U.S.

SECTION 5.

Consultation and Coordination

SECTION 5

Consultation and Coordination

The following is a list of agencies and governments that were consulted or coordinated with in preparation of this EA.

FEDERAL
Bureau of Land Management
U.S. Department of Defense, Ft. Bliss
U.S. Fish and Wildlife Service
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency (Regions 6 and 9)
Bureau of Indian Affairs

TRIBAL
Gila River Indian Community
Ysleta del Sur Pueblo
White Mountain Apache
Comanche Indian Tribe
Fort Sill Apache Tribe of Oklahoma
Kiowa Tribe of Oklahoma
Mescalero Apache Tribe
Navajo Nation
Pueblo of Isleta
Hopi Tribal Council
Ak-Chin Indian Community
Pascua Yaqui Tribe
Salt River Pima-Maricopa Indian Community
San Carlos Apache Tribe
Tohono O'odham Nation
Pueblo of Zuni

STATE
Texas Parks and Wildlife
New Mexico Department of Game and Fish
Arizona Game and Fish Department
Texas Commission on Environmental Quality
New Mexico State Land Office
Arizona Department of State Lands
New Mexico Environmental Department
Arizona Department of Environmental Quality
Arizona Department of Water Resources
New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division
Arizona State Historic Preservation Office
New Mexico State Historic Preservation Office

Texas State Historic Preservation Office
Arizona Department of Transportation
New Mexico Department of Transportation
Texas Department of Transportation

COUNTY AND LOCAL
El Paso County Department of Roads and Bridges
City of El Paso Engineering Department
City of El Paso Planning Department
Dona Ana County Flood Commission
Dana Ana County Planning Department
Luna County Planning Department
Grant County Manager's Office
Hidalgo County Manager's Office
Cochise County Highway and Floodplain Department
Cochise County Planning Department
Pima County Department of Environmental Quality
Pima County Zoning Department
City of Tucson
Pinal County Attorney
Maricopa County Environmental Services Department
Maricopa County Code Enforcement Department
Arizona State University Business Outlook Center

SECTION 6.

References

SECTION 6

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Adams, K. 1990f. AZ T:16:7 (ASM) Site Card. On file, Arizona State Museum, University of Arizona, Tucson.

Adams, K. 1990g. AZ T:16:111 (ASM) Site Card. On file, Arizona State Museum, University of Arizona, Tucson.

Adams, K. 1990h. AZ T:16:109 (ASM) Site Card. On file, Arizona State Museum, University of Arizona, Tucson.

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APPENDIX A.

Scoping Comments

GUARDIANS

'04 AUG -4

August 2, 2004

Lorraine Salas
Bureau of Land Management
Las Cruces Field Office
1800 Marquess
Las Cruces, NM 88005

In Re: Scoping Comments on Kinder Morgan SFPP East Line Pipeline Expansion Project

Dear Ms. Salas,

We are writing to express our concerns about the impacts of this project to the northern aplomado falcon, a species listed as Endangered under the Endangered Species Act. We are concerned about this project's potential to further diminish and fragment habitat and result in other harms to the falcon and for other federally protected or biologically imperiled flora and fauna.

Southwest New Mexico and southeast Arizona boast a diversity of native habitats which sustain native biodiversity, including highland oak-juniper canyons and hillsides, riparian valleys with cottonwood and willow habitat, rolling grassland with mountains and scrub, Chihuahuan desert , Sonoran desert, and mountain spruce and pine wilderness in the Gila National Forest.

We expect you will obtain county by county lists of special status species and analyze the impacts of this pipeline expansion project on all of these species.

We also expect you will consider in your environmental assessment an adequate range of alternatives, including the alternative of transitioning to renewable energies such as wind and solar power. In addition, we expect you will consider the environmental impacts of fossil fuel extraction and consumption, including climate change. Finally, we expect you will consider this project in the context of other ongoing land uses, including agriculture, oil and gas, mining, municipal development, road construction, off-road vehicle use, etc. In other words, we expect you to analyze the cumulative impacts from this project on native biodiversity.

Sincerely,

Nicole J. Rosmarino

Nicole J. Rosmarino, Ph.D.
Conservation Director

312 Montezuma, Suite A ▼ Santa Fe, New Mexico 87501 ▼ 505-988-9126 ▼ Facsimile 505-989-8623
www.fguardians.org ▼ swwild@fguardians.org

United States Department of the Interior
Bureau of Land Management
Las Cruces Field Office
1800 Marquess
Las Cruces, NM 88005
Ref: 1792 (03000)

July 29th, 2004

Dear Sir / Madam

Thank you for your letter dated July 2, 2004.
Please do not disclosed publicly my name in regards to the following comments regarding the referenced project

I am opposed to the projected pipeline for the SFPP East line Pipeline Expansion Project, as a concerned owner of a residential subdivision "Cavernen Estates" in Akela that depends on water wells. Contamination of the water wells are of a deep concern to me.
Not only I am deeply opposed to this project but I am also very disturbed by the fact that the existence of the old pipeline was disclosed to me only a few months ago.
Very Sincerely

EL PASO WATER UTILITIES
PUBLIC SERVICE BOARD

'04

LAS
LAS

July 12, 2004

Mr. Edwin L. Robinson
c/o Lorraine Salas
United States Department of Interior
Bureau of Land Management
Las Cruces Field Office
1800 Marquess
Las Cruces, New Mexico 88005

Subject: 1792 (03000)
Environmental Assessment for Kinder Morgan Project

Dear Lorraine Salas:

Please provide the El Paso Water Utilities with a copy of the environmental assessment mentioned above. The El Paso Water Utilities is very interested in the findings, since we are in the process of selling approximately 35 acres to Kinder Morgan for a fuel storage facility in Northeast El Paso, adjacent to Ft. Bliss Land, in the very near future.

If you have any questions please call me at (915) 594-5511.

Sincerely,

Juan Benavidez
Land and Contract Administrator

JB/ada

Executive West Office Plaza
201 N. Nevada, Suite B
Roswell, NM 88201

TONY R. ELIAS
Executive Director

SOUTHEASTERN NEW MEXICO ECONOMIC DEVELOPMENT DISTRICT

COUNCIL OF GOVERNMENTS

Phone: (505) 624-6131
Fax: (505) 624-6134
E-Mail: snmedd@dfn.com
Website: nmlocalgov.net

July 13, 2004

Lorraine Salas
Bureau of Land Management
Las Cruces Field Office
1800 Marquess
Las Cruces, NM 88005

RE: SFPP, L.P./Kinder Morgan East Line Pipeline Expansion Project

Dear Ms. Salas:

Thank you for the opportunity to review the above referenced application. Upon reviewing the proposed pipeline upgrade and enhancement project it does not appear that the work is located in the counties our district serves: Lincoln, Otero, Lea, Eddy and Chaves. Segment 1 includes 6 miles on Ft. Bliss, City of El Paso Land and proceeds west. Our nearest county is Otero which appears north of the proposed site. The Southeastern New Mexico Economic Development District/Council of Governments District 6 supports progress, new job creation, and enhanced efficient operations. The delivery system upgrades appear to enhance the safety and quality of the delivery system.

If you need additional information please contact me at (505) 624-6131. Thank you.

Sincerely,

Dora Batista

Dora Batista
Planning & Development

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO

OFFICE OF THE COMMISSIONER
UNITED STATES SECTION

JUL 16 2004

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LAS
LAS

Mr. Edwin L. Roberson
Field Manager
Bureau of Land Management
1800 Marquess
Las Cruces, New Mexico 88005
Attn: Lorraine Salas

Dear Mr. Roberson:

Thank you for your July 2, 2004 letter (1792 [03000]) requesting scoping comments for an Environmental Assessment (EA) for the SFPP, L.P./Kinder Morgan East Line Pipeline Expansion Project. The fact sheet you provided indicates that the proposed project would enhance and improve more than 240 miles of pipeline from west Texas through New Mexico and Arizona.

The United States Section, International Boundary and Water Commission (USIBWC), in its review of the fact sheet and follow-up telephone contact with Mr. Regan Giese (CH2M Hill) has determined that the proposed project is remote from and will not impact upon our projects in the vicinity; therefore, we have no scoping comments for the EA. We request that you remove us from the mailing list for this project. Thank you for including us in your initial agency coordination activities, and if you or your staff have questions, please call Mr. Douglas Echlin, Environmental Protection Specialist, at (915) 832-4741.

Sincerely,

Sylvia A. Waggoner

Sylvia A. Waggoner
Division Engineer
Environmental Management Division

cc:

Mr. Regan Giese
445 Executive Center Blvd., Suite 110
El Paso, Texas 79902

The Commons, Building C, Suite 310 • 4171 N. Mesa Street • El Paso, Texas 79902
(915) 832-4100 • (FAX) (915) 832-4190 • http://www.ibwc.state.gov

Bill Richardson

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH
One Wildlife Way
PO Box 25112
Santa Fe, NM 87504

Visit our website at www.wildlife.state.nm.us
For basic information or to order free publications, 1-800-862-9310

DIRECTOR AND SECRETARY
TO THE COMMISSION
Bruce C. Thompson

August 2, 2004

Lorraine Salas
BLM Las Cruces Field Office
1800 Marquess
Las Cruces NM 88005

Re: SFPP/Kinder Morgan East Line Expansion Project
NMGF Project No. 9465

Dear Ms. Salas:

The New Mexico Department of Game and Fish (Department) has received your notice of scoping for an Environmental Assessment for the above referenced project. We have reviewed the map, fact sheet and brochure which were provided. Our comments regarding NEPA scoping issues follow below.

The proposed project consists of a petroleum product pipeline system capacity increase, to be achieved through replacement of existing pipeline segments with larger diameter pipeline, and station and facility upgrades. Portions of the project are located in New Mexico, Arizona and the city of El Paso, Texas. The New Mexico portion consists of between 100 to 168 miles of pipeline across the southern portion of the state, including state, federal, city/county and private holdings.

We have enclosed with this letter the list of state threatened and endangered species for each affected county. Potential impact to those species should be addressed in the EA and associated right-of-way survey documents. We also enclose a copy of our Trenching Guideline. Open trenches and ditches can trap small mammals, amphibians and reptiles, and can cause injury to large mammals. The risk can be minimized by incorporating the Trenching Guideline into construction practices.

A reclamation plan is recommended for all short-term or long-term temporary surface disturbance. Stock-pile topsoil at the time of original construction. When the disturbed area is no longer needed, recontour the site to blend visually with surroundings, and return the drainage pattern as close as feasible to pre-existing conditions. Create furrows perpendicular to slope, if on a hillside, and seed with an appropriate certified weed-free mix of native grasses and forbs. In some cases seeding or transplant of woody species may be desirable. Follow up by monitoring to assure no development of erosion problems and successful establishment of vegetation.

Thank you for the opportunity to comment on the scoping phase for this project. The cover letter we received states that names will be removed from the mailing list for this project if the enclosed card is not returned, however no such card was enclosed. Please keep us on the mailing list for this project and notify us when the draft EA becomes available for review. We would prefer a hard copy format. If there are any questions, please contact Rachel Jankowitz at (505) 476-8159 or rjankowitz@state.nm.us.

Sincerely,

Lisa Kirkpatrick

Lisa Kirkpatrick, Chief
Conservation Services Division

cc: Susan McMullen, Ecological Services Field Supervisor, USFWS
Rachel Jankowitz , Habitat Specialist, NMGF
Luis Rios, SW Area Chief, NMGF
Pat Mathis, SW Area Habitat Specialist, NMGF

APPENDIX B.

Spill Prevention and Control Plan

Spill Prevention and Control Plan

SFPP East Line Expansion Project
El Paso to Phoenix

Prepared for

Bureau of Land Management
SFPP, L.P.

March 2004

by

CH2MHILL

Contents

SECTION 1

Project Description

This Spill Prevention and Control Plan (SPCP) describes measures the Contractor must implement to prevent, control, and minimize impacts from a spill of fuels or other hazardous substances during construction of the SFPP Eastline Expansion Project. The goal of the SPCP is to minimize the potential for a spill of these substances, to contain any spills to the smallest area possible, and to protect the environment, including those areas that are considered environmentally sensitive (e.g., stream, wetlands, etc.).

All construction working on the project will implement the measures and procedures in this SPCP. This SPCP does not certify the Contractor or individuals to become licensed waste haulers.

SECTION 2

Prevention Measures

The Contractor will ensure that all practicable measures are taken to minimize the potential for and consequences of a spill during construction of the project. The Contractor is responsible for complying with applicable environmental and safety laws and regulations and to provide training to construction to personnel and equipment designed to prevent pollution.

The proper use of materials and equipment greatly reduces the potential of contamination. The following is a list of general preventative practices to be used during construction of the project:

- The Contractor must supply each construction crew with spill kits containing a sufficient quantity of absorbent and barrier materials to adequately contain and recover potential spills of fuels or lubricating oils. These kits may include, but are not limited to, drip pans, buckets, absorbent pads, straw bales, absorbent clay, sawdust, floor-drying agents, spill containment barriers, heavy plastic sheeting, plastic bags, shovels, and sealable containers. These materials must be readily accessible during all construction activities.
- The Contractor will train all personnel who handle fuels and other regulated substances to follow spill prevention procedures and to quickly and effectively contain and cleanup spills.
- Fuels and lubricating oils for vehicles or heavy equipment will not be stored in wetlands or near waterbodies, and refueling of construction equipment will be limited to upland aras.
- Authorized personnel shall only dispense fuels during daylight hours. Fuel dispensing operations may not be left unattended.
- On-site vehicles will be monitored for leaks and receive regular maintenance to reduce the chance of leaks. Vehicle maintenance wastes, including used oils and other fluids, will be handled and managed by personnel trained in the procedures outlined in this plan.
- Storage containers will display labels that identify the contents of the container and whether the contents are hazardous. The Contractor shall maintain and provide, on demand, copies of all Material Safety Data Sheets (MSDS)
- Site foremen and construction personnel that will be working with hazardous or regulated substances will be trained in the requirements of this plan prior to participation in site work.

SECTION 3

Spill Response

Immediately upon learning of the spill of any fuel, oil, hazardous substance or other regulated substance:

- Identify the source of a spill and take all necessary measures to prevent further material from being spilled.
- If it is safe to do so, remove all potential ignition sources if the spilled material is combustible or flammable.
- Notify the Contractor's spill coordinator. The Contractor's spill coordinator will notify the SFPP Environmental Inspection Team (EIT).
- Assess the situation and determine subsequent cleanup activities and responsibilities.
- If the spill is beyond the response ability of on-site equipment and personnel, immediately notify the SFPP EIT that an emergency response contractor is needed.

For spills that occur on land, earthen berms will be constructed with available equipment to physically contain spills, if appropriate. Absorbent materials will also be applied to soak up

Spilled material, and traffic will be minimized on contaminated soils.

For spills that occur near or into a stream, wetland, or other waterbody, regardless of size, the following conditions shall apply in addition to the above measures:

- For spills in standing water, floating booms, skimmer pumps, and holding tanks will be used as appropriate to recover and contain released materials on the surface of the water.
- For a spill threatening a waterbody, berms and/or trenches will be constructed to contain the spill prior to entry into the waterbody. Deployment of booms, skimmers, and sorbent may be necessary if the spill reaches the water.
- Spilled material will be immediately and completely contained and cleaned up if it is safe to do so. The material manufacturer's methods for spill cleanup will be followed as described on the material MSDS.

All contaminated soils, vegetation, absorbent materials, and other contaminated wastes shall be handled, contained, and disposed of by the Contractor in accordance with applicable local, state, and federal regulations.

SECTION 4

Reporting Procedure

The Contractor is required to report all spills of hazardous substances, regardless of size or location. The Contractor is also required to notify the SFPP EIT of any of the following hazardous conditions:

- "Hazardous substance" means any substance, mixture or substances, that presents a danger to the public health or safety and includes, but is not limited to, a substance that is toxic, corrosive, or flammable, or that is an irritant or that, in confinement, generates pressure through decomposition, heat, or other means. The following are examples that, is sufficient quantity, may be hazardous: acids; explosive; fertilizers; heavy metals such as chromium, arsenic, mercury, lead and cadmium; industrial chemicals; paint thinners; paints; pesticides; petroleum products; poisons; radioactive materials; sludges; and organic solvents.
- "Hazardous condition" means any situation involving the actual, imminent, or probable spillage, leakage, or release of a hazardous substance onto the land, into a water of the state or into the atmosphere, which, because of the quantity strength, and toxicity of the hazardous substance; its mobility in the environment; and its persistence, creates an immediate or potential danger to the public health or safety or to the environment.

Depending on the material spilled, and the quantity and location of the spill, a call to the National Response Center and/or appropriate state agencies may be required. Each state has different reporting requirements. The Applicant's EIT PI shall report a hazardous substance spill or hazardous condition to the National Response Center and/or appropriate state agency if:

- A hazardous substance has the potential to leave the property by flowing over the surface or through sewers, tile lines, culverts, drains, utility lines, or some other conduit.
- A hazardous substance has the potential to reach any surface or groundwater.
- Any hazardous substance has spilled directly to a water of the state.
- A hazardous substance is detected in the air at the boundaries of the construction ROW by the senses (sight and smell) or by monitoring equipment.
- There is a hazardous condition that poses a potential threat to the public health and safety.

Reportable quantities are as follows:

- A spill of any hazardous substance in a quantity of 5 gallons or greater on land.
- Any amount of substances such as paint, solvents, fertilizer, acids, etc.
- Any spill of solid petroleum product greater than 100 pounds.
- Any spills to a water of the state. The Emergency Management Agency defines waters of the state to be feature such as streams, creeks, wetlands, and drainageways, etc.

Furthermore, the feature is not required to be holding water at the time of the spill. Therefore, a spill into a dry creekbed, unsaturated wetland, or drainageway would warrant a notification call.

The appropriate federal and state contacts for the project are as follows:

In Navigable waters call:	National Response Center (Washington D.C.) Phone: (800) 424-8802 (24 Hours)
In Texas, call:	Environmental Release Hotline Phone: (800) 832-8224 or Texas Natural Resource Conservation Commission Phone: (512) 237-2507 or (512) 463-7727
In New Mexico, call:	Hazardous Material Bureau - Emergency On-Call Phone: (505) 660-3107
In Arizona, call	Emergency Response Hotline (24 Hours) Phone: (602) 207-2230 or Toll Free in Arizona: (800) 234-5677 Ext. 2330

APPENDIX C.

Storm Water Pollution and Prevention Plan (SWPPP) for Construction Activities

Storm Water Pollution Prevention Plan for Construction Activities

SFPP East Line Expansion Project, EL Paso to Phoenix

March 5, 2004

CH2MHILL

Contents

Section Page

Tables

Acronyms

BMP	best management practice
CFR	Code of Federal Regulations
EA	environmental assessment
EPA	U.S. Environmental Protection Agency
ft^2	square feet
mi	mile
MP	Mile Post
MSDS	Material Safety Data Sheet
NPDES	National Pollutant Discharge Elimination System
SCP	Sediment Control Plan
SFPP	SFPP, L.P.: Operating partnership for Kinder Morgan Energy Partners, L.P.
SWPPP	Storm Water Pollution Prevention Plan

1.0 Introduction

Purpose

SFPP, L.P. (SFPP) operating partnership for Kinder Morgan Energy Partners, L.P. is proposing to construct a petroleum products pipeline divided into four segments that will generally parallel existing pipelines along SFPP's present route from El Paso, Texas to Phoenix, Arizona. This project, the SFPP East Line Expansion Project, will provide much needed additional capacity for petroleum products into the rapidly growing Tucson/Phoenix markets. The SFPP plan is to begin construction in the second-third quarter of 2005.

This Storm Water Pollution Prevention Plan (SWPPP) was developed for the construction activities related to SFPP's pipeline in New Mexico and Phoenix, Arizona consistent with the U.S. Environmental Protection Agency (EPA) Region 6 and Region 9 National Pollutant Discharge Elimination System (NPDES) General Construction Storm Water Permit (Storm Water Permit) conditions. The SWPPP for the Texas portion of the pipeline construction will be consistent with Texas Commission on Environmental Quality (TCEQ) Texas Pollutant Discharge Elimination System (TPDES) permit requirements.

This plan provides an overview of proposed construction activities at the SFPP route, and includes procedures that will be implemented during construction activities to prevent or reduce pollutants in storm water discharges. Each of the following elements is addressed consistent with the Storm Water Permit:

- Site description
- A description of control measures or Best Management Practices (BMPs) that will be implemented to control pollutants in storm water discharges
- Procedures for maintaining control measures
- Inspection procedures
- Identification of non-storm water discharges

This plan is a working document and will be modified as necessary when there is a change in design, construction, operation, or maintenance activities. Minor changes shall be handwritten in this plan. The plan shall be revised and re-issued if there are significant changes (e.g., change in construction area boundary described in attached map) or when there are a large number of handwritten changes to this plan.

2.0 Site Description

The East Line system consists of two parallel pipelines - an 8-inch and a 12-inch - originating in El Paso, Texas. The 8-inch pipeline terminates in Tucson, Arizona and the 12-inch continues to Phoenix, Arizona. The 12-inch line between Tucson and Phoenix contains two segments that are 8 inches in diameter. The four segment locations are as follow:

- Segment 1 is defined as the Diamond Junction to Breakout Segment and includes the portion of the proposed 16-inch pipeline between Milepost (MP) 9.10 at the existing Diamond Junction facility and MP 15.3 at the proposed Breakout facility. From Diamond Junction, the proposed pipeline follows existing pipelines along the northwest side through Fort Bliss, TX. After approximately 5 miles, the line crosses the Union Pacific Railroad and parallels an existing pipeline corridor heading in a northwesterly direction. This corridor is currently occupied by multiple El Paso Natural Gas & SFPP Pipelines.
- Segment 2 is defined as the Rio Grande to Apache Pass Segment and includes the portion of the proposed 16-inch pipeline between Milepost (MP) 38.86 and MP 208.16 at the Apache Pass valve. The proposed pipeline follows existing pipelines along the north side. After approximately 25 miles, the line runs parallel to the Union Pacific Railroad for another 13 miles; at this point, it also parallels Interstate 10 (I-10). The line generally continues to follow the I-10 and Union Pacific Railroad corridor until separating for the last 23 miles, continuing along the existing pipeline to the Apache Pass valve. There are two short, alternative alignments in the area of the Deming Station and west of the Lordsburg Station.
- Segment 3 is defined as the Marana to Toltec Segment and includes the portion of the proposed 12-inch pipeline between MP 335.89 and MP 366.74 (at the Toltec Pump Station). This segment runs entirely along I-10 and the Union Pacific Railroad corridor, except for the re-route around Eloy (approximately 2 miles) where the route crosses I-10 and proceeds to the Toltec Station.
- Segment 4 is defined as the Bon to Salt River Segment and includes the portion of the 12-inch pipeline between MP 386.81 (Bon) and MP 420.40 (Salt River). The proposed route follows the existing pipeline except for a re-route around the small town of Maricopa to avoid Union Pacific Railroad property and the town. An alternative route passes through the town, as does the existing pipeline being replaced. A large portion of this segment is within the Gila River Indian Reservation. This segment crosses the Gila River.

A Description of the Construction Activities

The construction activities of the East Line pipeline would include the installation and replacement of approximately 233.2 miles of pipeline. The upgrades include the installation of approximately 167.2 miles of 16-inch-diameter pipeline between El Paso and Tucson and approximately 66 miles of 12-inch-diameter pipeline between Tucson and Phoenix. The construction activities generally would take place in the Right-of-Way corridor at a width of approximately 100 feet.

Typically, a 5 to 6 foot deep ditch is excavated. However, the depth of the ditch can vary when special conditions are encountered that require additional depth. A typical trench will be 24 to 36 inches wide. The ditch will be excavated using trenchers, tracked and/or wheeled backhoes. An exception to the mechanical excavation will be hand digging to locate buried utilities, such as other pipelines, cables, waterlines and sewerlines. No blasting is anticipated. Water trucks are used for dust control along the right-of-way as required.

The type of soils encountered will determine the type of equipment used for ditching. Harder soils such as caliche require larger trenchers and generally cannot be excavated using a backhoe.

When segregation of topsoil is required, an excavator will be used to remove the designated amount of topsoil. This topsoil is typically placed along the side of the ditch, opposite the side designated for pipe assembly.

The construction activities include the following actions:

- Ditching
- Pipeline Handling and Stringing
- Field Pipe Coating on girth welds
- Lowering and Backfilling
- Cleanup and Restoration

The control measures identified in this SWPPP are applicable to the construction activities described above and will be implemented as appropriate during these activities.

Potential Sources of Contamination from Construction

The potential sources of pollutants that could be discharged in storm water during construction activities include:

1. Vehicle and equipment fueling
2. Load and unloading areas
3. Vehicle and equipment maintenance areas
4. Excavated/trenched areas
5. Excavated soil and equipment staging areas
6. Waste and material storage areas

Affected Area of the Site

The area to be affected by new construction will be approximately 2,826.44 acres (233.2 miles x 5,280 feet x 100 feet wide /43,560 square feet [ft^2]/acre). The permanent easement will be an area of generally 10 feet wide x 233.2 miles x 5,280 feet/43,560 ft^2/acre= 282.7 acres.

Runoff Coefficient

The runoff coefficient ("C") is the percentage of precipitation volume that will not be absorbed by the ground surface. The runoff co-efficient will vary for different portions of the project length especially due to the different elevations found in the rocky region as described in the Topography section found in Section 2. An Erosion and Sediment Control study can be found in Section 3.

Location and Description of Any Anticipated Storm Water or Non-Storm Water Components

Other construction activities include pump station and terminal construction.

There are several pump stations along the East Line system pipelines: El Paso Station (8-inch and 12-inch), Deming Station (8-inch and 12-inch), Lordsburg Station (8-inch only), Tucson Terminal (12-inch only), Toltec Station (12-inch only) and Phoenix Terminal (12-inch / 8-inch).

These pump stations and terminals will be upgraded as part of this project to accommodate the increased capacity resulting from the proposed pipeline upgrades described in Section 3.1. Deming Station and Tucson Terminal are the only facilities along the proposed route that will require pump upgrades.

In addition, a new breakout terminal will be installed approximately at M.P. 15.7. The terminal will receive product from three inbound pipelines, accumulate the product in the tanks, and ship out on two outbound lines at higher flow rates. Storage and pumping will be the main activities at this terminal.

Topography

The route that contains the East Line pipeline has elevations that vary from roughly 700 to nearly 4,000 feet. Typical dry desert topography is observed in this rocky region along with mesas and plateaus. The East Line pipeline also crosses the Chihuahuan and Sonoran Desert.

The Chihuahuan Desert's northern portion extends into southeastern Arizona, southern New Mexico, and Trans-Pecos Texas. The region is also characterized by mountain ranges, separated by valleys (bolsons) throughout. The Franklin Mountains, which bisect the northern Chihuahuan Desert city of El Paso, is a typical medium-sized range. Desert mountains range from slight prominences to soaring highlands. Regardless, such ranges provide habitats absent on the flatlands and add new species to the regional biota.

The Chihuahuan Desert has relatively high elevations that can reach 5500 ft. This desert tends to have hot summers and cool to cold winters with occasional winter frosts, and/or freezes.

The Chihuahuan Desert is predominantly a shrub desert. Common plants include the Four-winged Saltbush (Atriplex canescens), Mariola (Parthenium incanum), and Honey Mesquite

(Prosopis glandulosa); succulents such as a variety of small to medium-sized cacti, yuccas (Yucca elata, Yucca torreyi), and agaves (including Agave lechuguilla, also often considered an indicator plant of the Chihuahuan Desert). Various grasses also occur, including Black Gramma (Bouteloua eriopoda) and Tobosa Grass (Hilaria mutica). Other plants include Ocotillo (Fouquieria spendens), Sotol (Dasylirion spp.), and the Barrel Cactus (Ferrocactus wislizenii).

Animals that can be found in the Chihuahuan Desert include Desert Cottontail (Sylvilagus audubonii), Black-tailed Jack Rabbit (Lepus californicus), Cactus Mouse (Peromyscus eremicus), Kit Fox (Vulpes velox), Cactus Wren (Campylorhynchos brunneicapillus), Greater Roadrunner (Geococcyx californianus), Mojave Rattlesnake (Crotalus scutulatus), Coachwhip snake (Masticophis flagellum), New Mexican Whiptail lizard (Cnemidophorus neomexicanus), Red-spotted Toad (Bufo punctatus), and Tiger Salamander (Ambystoma tigrinum) (http://nasa.utep.edu/chih/chihdes.htm).

The Sonoran Desert is an arid region covering 120,000 square miles in southwestern Arizona and southeastern California, as well as most of Baja California and the western half of the state of Sonora, Mexico. Subdivisions of this hot, dry region include the Colorado and Yuma deserts. This is the hottest of our North American deserts, but a distinctly bimodal rainfall pattern produces a high biological diversity. Winter storms from the Pacific nourish many West Coast annuals such as poppies and lupines, while well-developed summer monsoons host both annuals and woody plants originating from the south. Freezing conditions can be expected for a few nights in winter.

Trees are usually well developed on the desert ranges and their bajadas. Often abundant on these well-drained soils are Little-leaf Palo Verdes, Desert Ironwoods, Catclaw and Saguaro.

The understory consists of three, four or even five layers of smaller woody shrubs. Tall chollas may occur in an almost bewildering array of species. The alluvial lowlands host communities of Desert Saltbush, wolfberry and bursage. On coarser soils, Creosote Bush and bursage communities may stretch for miles. Where the water table is high, Honey or Velvet Mesquite may form dense bosques or woodlands.

Other species are restricted to alkaline areas. Stream sides may be lined with riparian woodlands composed of Arizona Ash, Arizona Black Walnut, Fremont Cottonwood and various willows, with a dense understory of Arrow-weed, Seepwillow and Carrizo. The Sonora Desert is rich in animal life as well, with many species in all groups derived from tropical and subtropical regions (www.desertusa.com/du_sonoran.html).

Regional and Site Surface Hydrology

Surface water drains across the region via arroyos and canyons that are typically dry drainageways. Surface water ultimately discharges to the Rio Grande and Colorado River if flows are of sufficient enough volume to reach the river rather than infiltrating into the porous arroyo and canyons. In the portions of land in El Paso or Fort Bliss, surface waters either infiltrate into the desert soils or are captured in unlined stormwater retention ponds, but do not flow to the Rio Grande.

Endangered Species and Historic Places

Consistent with the conditions of the Storm Water Permit, the impacts of storm water discharge-related activities on federally listed endangered and threatened species, and designated critical habitat must be assessed. These species may include the following species.

Special Status Species Potentially Affected by the Proposed Action

Common Name	*Scientific Name*	Status
Cactus ferruginous pigmy-owl	*Glaucidium brasilianum cactorum*	ESA-Endangered
Northern aplomado falcon	*Falco femoralis septentrionalis*	ESA-Endangered
Western burrowing owl	*Athene cunicularia*	BLM Sensitive
Jaguar	*Panthera onca*	ESA-Endangered
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	ESA-Endangered
Cave myotis	*Myotis velifer*	BLM Sensitive
Fringed myotis	*Myotis thysanodes*	BLM Sensitive
Mexican long-nosed bat	*Leptonycteris nivalis*	ESA-Endangered
Mexican long-tongued bat	*Choeronycteris mexicana*	BLM Sensitive, AZ-WC
Western small-footed myotis	*Myotis cillolabrum*	BLM Sensitive
California leaf-nosed bat	*Macrotis californicus*	BLM Sensitive, AZ-WC
Desert tortoise-Sonoran population	*Gopherus agassizi*	BLM Sensitive, AZ-WC
Texas horned lizard	*Phrynosoma cornutum*	BLM Sensitive
Acuna cactus	*Echinomastus erectocentrus acunensis*	ESA-Candidate
Sand prickly-pear cactus	*Opuntia arenaria*	New Mexico - Threatened

ESA-Endangered—A species that is considered to be in danger of extinction throughout all or a significant portion of its range and is listed under the Endangered Species Act.

ESA-Candidate—Any species for which there is sufficient information on biological vulnerability and threats to support a proposal to list as endangered or threatened under the Endangered Species Act but for which preparation and publication of a proposal by the USFWS is precluded by higher-priority listing actions.

BLM Sensitive—Species occurring on BLM land that are considered sensitive by the state offices.

New Mexico - Threatened—A species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range in New Mexico as determined by the New Mexico Department of Game and Fish.

AZ-WC = Wildlife of Special Concern in Arizona—Species whose occurrence in Arizona is or may be in jeopardy, or with known or perceived threats or population declines, as described by the Arizona Game and Fish Department's listing of Wildlife of Special Concern in Arizona October 1996 Draft.

An Environmental Assessment (EA) has been performed to assess potential impacts the project might have on endangered, threatened, or species of concern in the project area. The

EA also investigates cultural resources impacts as relevant by the National Historic Preservation Act, the Bureau of Indian Affairs and other agencies.

3.0 Best Management Practices for Storm Water Pollution Prevention

The best management practices (BMPs) described below shall be implemented as appropriate to prevent and control storm water run-on and runoff during construction activities at the SFPP route. The description of controls includes:

1. Control measures for potential pollutant sources
2. Erosion and sediment controls, including structural and stabilization practices
3. Materials handling
4. Spill prevention, control, and response

Control Measures for Pollutant Sources During Construction Activities

Specific measures to control pollution discharge from pollutant sources during construction include:

1. **Vehicle and Equipment Fueling Areas:** All fueling stations will have temporary secondary containment around the fuel tanks.

2. **Loading and Unloading Areas:** Any material/fuel spilled during loading and unloading will be cleaned up immediately.

3. **Vehicle and Equipment Maintenance Areas:** If vehicle maintenance is necessary, it will be performed in an area designated for this purpose. Any spills will be cleaned up immediately. Precautions will be taken to prevent the release of pollutants to the environment from vehicle maintenance. Precautions will include the use of drip pans, mats, and other similar methods. No vehicle wash water shall be allowed to run off the construction site or enter state waters.

4. **Excavated/Trenched Areas:** To prevent the mobilization of contaminants in storm water runoff from entering and/or leaving excavated areas, the BMPs described in the following section on Erosion and Sediment Controls will be implemented.

5. **Waste and Material Storage Area:** Materials on the construction site will be in stored in areas designated for that purpose. Suitable measures will be taken in these areas to reduce the likelihood of a discharge.

Erosion and Sediment Control Plan

In order to ensure that selected sediment and erosion control BMPs are appropriately protective of storm water quality the EPA requirements specified for New Mexico in the Construction General Permit require that operators develop a Sediment Control Plan (SCP). The SCP is not intended to be a separate document but rather is expected to be largely fulfilled by information that is included throughout an overall site-specific SWPPP. To complete the SCP a registered professional engineer must certify the rationale for choosing site BMPs based on demonstration that the BMPs will result in no increase in sediment yield from pre-construction conditions.

The following section will act as a Sediment Control Plan for the state of New Mexico as well as the whole route to include Texas and Arizona.

The construction activities at the SFPP route will conform to the following goals and criteria, as appropriate:

- Implement erosion and sediment controls during construction to retain sediment onsite to the extent practicable.
- Select, install, and maintain control measures in accordance with the manufacturer's specifications and good engineering practices. If periodic inspections or other information indicate that a control measure has been used inappropriately or incorrectly, that control measure will be modified or replaced as necessary.
- In the event that sediment escapes the construction site, remove offsite accumulations of sediment to minimize offsite impacts if deemed necessary. This would be performed under proper clearances and landowner approvals.
- Remove sediment from sediment traps or sedimentation ponds when design capacity has been reduced by 50 percent.
- Implement construction practices at the SFPP route that prevent litter, construction debris, and construction chemicals exposed to storm water from becoming a pollutant source for storm water discharges.

Erosion and sediment runoff is controlled within the SFPP through the use of structural and/or stabilization practices. Structural control practices may include the use of straw bales, silt fences, earth dikes, drainage swales, sediment traps, and sediment basins. Stabilization practices may include temporary or permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, and preservation of mature vegetation.

There are several different structural controls that will be used to control the quality of the storm water coming off the construction site. Table 3-1 lists the controls that may be put in place during construction activities.

TABLE 3-1
Structural Control Measures

Control Measure	Location	Description of Control Measure
Silt Fencing	Along the perimeter of the excavation sites adjacent to streams, wetlands, or washes. Drainage areas should be less than 0.25 acre per 100 feet of fence length.	To protect streams or wetland areas, to prevent erosion, and to keep sediment onsite. Silt fencing consists of posts with filter fabric stretched across the posts. The lower end of the fence is vertically trenched and covered with back fill. This prevents water from passing by the fence without being filtered. The fabric allows for the water to pass offsite while retaining the sediment onsite.
Check Dams	On the average, where the grade change is more than 2 percent or where possible.	A check dam is a small, temporary dam constructed across a drainage ditch or channel. Its purpose is to slow down the speed of the concentrated flows. The reduced runoff speed will result in less erosion and gulling in the channel and allow the sediment to settle out. The check dams can be built with materials such as straw bales, rock, timber, or other material that will retain water.
Straw Bales	Installed around areas requiring protection such as wetlands to form a temporary containment.	Straw bales work much like silt fencing and may be used instead of silt fence. They can be used to form a barrier or redirect water. They impede storm water flow. Unlike silt fence, straw bales do not allow water to flow through freely, thus they are used where detention, not just filtration, is necessary.
Stream Crossing	Crossings may be necessary when working near or close to wetland areas. Areas of use will be determined in the field.	Bridge or culvert across a stream or watercourse for short-term use. The purpose is to prevent the damage to watercourses that would occur if vehicles were driven in the wetlands.
Sediment Basins	Sediment basins are required for drainage locations that serve 10 or more disturbed acres at one time. For drainage locations serving less than 10 acres, smaller sediment basins or sediment traps should be used. At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required.	Sediment basins are either temporary or permanent settling ponds with a controlled storm water release structure. Their function is to collect and store sediment-laden storm water from construction activities long enough to allow the sediment to settle out.

•

Stabilization practices that will be implemented, as appropriate, within the SFPP route are listed in Table 3-2. Final stabilization will consist of grading areas to final grading conditions.

Table 3-2
Stabilization Control Measures

Control Measure	Location	Description of Control Measure
Preservation of Natural Vegetation	Wherever practical.	Wherever possible, existing vegetation should be retained. It minimizes erosion potential and protects water quality. The preservation of natural vegetation between the silt fence and stream will provide additional water quality improvement prior to the storm water entering state waters.
Permanent seeding	Where reseeding is required, the ROW will be seeded with a certified weed free native seed mixture not to exceed 15 pounds per acre.	Provides stabilization of the soil and reduces erosion.
Mulching	On slopes steeper than 2:1 or on areas that have been seeded. Must be implemented within 14 days of activity ceasing.	Soil stabilization or erosion control practices where materials such as grass wood chips, hay, etc. are placed on the soil surface to allow seeded areas to become established

Materials Handling

The following materials handling practices will be implemented during construction activities:

1. The area will be kept free of trash and spilled oil. No liquid waste will be held on site in tanks.
2. Garbage and trash will be removed daily from the site in vehicles.
3. Material Safety Data Sheets (MSDSs) for substances used or stored on the construction site will be available for review and use.

Materials stored onsite shall be inventoried. Additional materials brought onsite will be recorded.

Spill Prevention, Control, and Response

Refer to the Spill Prevention and Control Plan, which is located in Appendix B of this document.

Measures to Protect Endangered Species and Critical Habitat

If endangered species and/or designated critical habitats are found on or in proximity to the construction site, a mitigation plan will be developed to determine the possible impacts the construction activity could have on the endangered species and address the necessary measures to minimize any impacts.

Other Controls

Employee Training

SFPP shall ensure that all appropriate personnel and subcontractors are aware of the SWPPP requirements and the measures upon which they need to comply.

Road Maintenance

Heavy equipment and vehicle traffic will be limited as much as possible to existing roads, or designated new roads, to minimize areas of new disturbances.

General Controls

The following general erosion control requirements shall be implemented during construction activities:

1. Minimize the time that bare soil is exposed before stabilized.
2. Minimize the disturbance to existing vegetation.
3. No solid materials, including building materials shall be discharged to waters of the United States, unless authorized under a Clean Water permit (i.e., 404 Permit).

The following general erosion control requirements shall be implemented after construction activities are complete:

1. Where practical, mulch or install excelsior blankets and reseed slopes greater than 3:1, depending on the length, exposure, and texture of the soils on the slope. Mulch may be natural, consisting of slash, brush, manure, and vegetation previously chipped and stockpiled; and/or clean straw, free from noxious weed seed, mold, and other harmful elements; or wood cellulose fiber. Mulch should be applied as soon as possible after seeding to reduce runoff and promote vegetation.

2. Furrow-contour sidehill slopes whenever equipment is available that can do so. Otherwise the final grading should be performed in a manner that will result in tracks and depressions contoured across the slope instead of down the “fall-line.” This will not only minimize wind erosion, but will also “roughen” the earth to provide a microclimate of wind protection for new plants, and will help conserve precipitation for use in growth of new seed. This results in a reduction of sediment erosion.

3. Where slope cuts from erosion have developed (particularly along the faces of flood detention structures), remove loose granular material and fill the area with suitable soils to the original profile of the bank or slightly above the original profile. If the cut is not completely filled, the steeper area at the brow of the cut will encourage erosion and may

cause redevelopment of the cut. Inspect the area upstream from the cut carefully to determine if there was an irregularity in the ground profile that caused storm water to concentrate and erode the soils. Any such irregularity should be removed using the most appropriate BMP. This will ensure that water runs off the site as sheet flow.

Maintenance

All erosion and sediment control measures and other protection measures will be maintained in effective operating condition. Maintenance will be performed on an "as-needed" basis. Specific maintenance requirements include, but are not limited to:

1. Removal of sediment and other debris collected behind silt fences or hay bales.
2. Cleaning of sediment from detention ponds whenever the capacity of the ponds is reduced to 50 percent.

4.0 Inspection Procedures

Inspection Requirements for Sites During Construction

Consistent with the Storm Water Permit, inspection during construction activities of the site will be performed at least once every 30 days and within 24 hours of a precipitation event of 0.5 inches or greater, which may result in surface erosion. During seasonal arid periods in arid areas (areas with an average annual rainfall of 0 to 20 inches) and semi-arid areas (areas with an average annual rainfall of 10 to 20 inches), inspections shall be conducted at least once every month. Inspections shall consist of a review of the construction site perimeter, disturbed areas, and areas used for material storage that are exposed to precipitation. These areas will be reviewed for evidence of, or the potential for, pollutants entering the drainage system. The controls identified in Section 3 will be inspected to ensure they are being implemented properly.

As necessary, the SWPPP will be revised to incorporate any changes that come about as the result of the inspection. Changes that affect the description of pollutant sources or the pollutant prevention control measures will be made to the SWPPP within 7 days of the inspection, as required by the Storm Water Permit. A record of the inspection shall be kept at the construction site as part of the SWPPP.

Inspections shall be the responsibility of and performed by SFPP and/or its appointed designee. Inspections will be recorded on the SWPPP Inspection Checklist. A copy of an area-specific map or plan will accompany inspections and be manually updated as necessary during the inspection to reflect any changes or additions in the following features:

- Construction site boundaries
- Areas of soil disturbance
- Areas that will not be disturbed

- Approximate slopes after major grading
- Areas of cut and fill
- Locations of major erosion control facilities or structures
- Locations where stabilization practices are expected to occur
- Springs, streams, wetlands, and other surface waters
- Storm water discharge locations

The updated maps and the SWPPP Inspection Checklist will be maintained as records, consistent with the Storm Water Permit.

Table 4-1 on the following page provides a guideline for inspecting BMPs.

TABLE 4-1
Storm Water BMP Maintenance Guidelines

CHECK DAM Has accumulated sediment and debris been removed from behind dams? Have materials removed been properly disposed of?
EROSION CONTROL BLANKET Is fabric damaged, loose or need repairs?
INLET PROTECTION Is the inlet protection damaged, ineffective or need repairs? Has sediment been removed?
MULCHING Distributed uniformly on all disturbed areas? Any evidence of mulch being blown or washed away? Has the mulched area been seeded?
SEDIMENT BASIN Has sediment and debris been cleaned out of the basin? Have materials removed been properly disposed of?
SILT FENCE Is the fence damaged, collapsed, un-entrenched or ineffective? Has sediment been removed from behind fence? Is the silt fence properly positioned?
SLOPE DRAIN Is water bypassing or undercutting the inlet or pipe? Is erosion occurring at the outlet of the pipe?
STRAW BALE BARRIER Are the straw bales damaged, ineffective or un-entrenched? Has sediment been removed from behind bales? Are the bales installed and positioned correctly?
SURFACE ROUGHENING Any vehicle tracks evident on roughened slopes? Any evidence of erosion?

TABLE 4-1
Storm Water BMP Maintenance Guidelines

TEMPORARY SEEDING Are the seedbeds protected by mulch? Has any erosion occurred in the seeded area? Any evidence of vehicle tracking on seeded areas?
TEMPORARY SWALES Has any sediment or debris been deposited within the swales? Have the slopes of the swale eroded or has damage occurred to the lining?
VEHICLE TRACKING Is gravel surface clogged with mud or sediment? Is the gravel surface sinking into the ground? Has sediment been tracked onto public roads; has it been cleaned up?

5.0 Recordkeeping

Consistent with the Storm Water Permit, major grading events, initiation of stabilization measures, and other activities will be recorded as well as inspections.

SWPPP INSPECTION CHECKLIST

DATE:
INSPECTOR:

According to EPA's General Construction Storm Water Permit the construction site is to be inspected at least once every thirty (30) calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater. The general areas or items that need to be inspected include disturbed areas of the construction site, areas used for storage of materials, structural control measures, and locations where vehicles enter or exit the site. Storm water controls or BMPs including silt fences, check dams, inlet protection, mulching, seeding, etc. are to be individually inspected to determine any maintenance requirements and/or if they are operating as intended.

OVERALL SITE INSPECTION PROCEDURES	YES	NO	N/A	COMMENTS/CORRECTIVE ACTION
Is there any evidence of sediment leaving the construction site? If so, note areas.	☐	☐	☐	
Have any adverse impacts such as flooding, structural damage, erosion, spillage, or accumulation of sediment, debris or litter occurred on adjacent property, wetlands or surface waters?	☐	☐	☐	
Have the Storm Water BMPs been placed as shown on drawings or plans?	☐	☐	☐	
Are the Storm Water BMPs functioning as intended?	☐	☐	☐	
Is work being done according to approved plans?	☐	☐	☐	

INSPECTOR'S SIGNATURE:	**DATE:**

APPENDIX D.

Noxious Weed Management and Rehabilitation Plan

Noxious Weed Management and Rehabilitation Plan

SFPP East Line Expansion Project
El Paso to Phoenix

Prepared for

Bureau of Land Management
SFPP, L.P.

March 2004

CH2MHILL

Contents

List of Tables

Definitions

Exotic Plants	Species not indigenous to a given area prior to European settlement.
Native Plants	Species that are indigenous to a given area prior to European settlement.
Noxious Weeds	Species identified by public law as exerting substantial negative environmental or economic impact. Noxious weeds are a subset of exotic plants. The term "noxious weeds" is a legal classification, not an ecological term. Noxious weed lists for the states of Texas, New Mexico and Arizona are provided in a table at the end of this document.

SECTION 1

Statement of Purpose

SFPP, L.P. is committed to preventing the spread of noxious weed along lands disturbed by its pipe line installation activities. The Application solicited comments from Bureau of Land Management (BLM) State Weed Coordinators along the proposed route. Comments received were incorporated into this Management and Rehabilitation Plan, which lists measures that will be implemented by SFPP to control noxious weeds the proposed project ROW.

SECTION 2

Background and Existing Environment

Exotic plants are often early-successional, pioneer species that are very successful at colonizing disturbed area. They typically produce large quantities of easily-dispersible seeds that establish quickly and grow to out-compete natives for water, nutrients, and other resources. They may also spread vegetatively following disturbance. Some exotic plants, in particular many noxious weeds, can become established without soil disturbance. Once introduced into an area, these species can invade intact vegetative cover and displace native plants.

Disturbed areas such as road ROWs often harbor exotic plant species, including noxious weeds. Since the proposed pipeline will occur within previously disturbed ROW, exotic plants including noxious weeds are already present along portions of the route.

SECTION 3

Determination

The proposed action will take place within some areas of known noxious weed populations, and will cause additional soil disturbance. Therefore, it has potential to contribute to the spread of noxious weeds in some areas in the absence of appropriate prevention measures. The risk factor for noxious weed spread by the proposed project has been determined to range from low to moderate.

The risk for noxious weed spread is low in areas along the route in which noxious weeds are present adjacent to, but not within, the proposed alignment. The risk for noxious weed spread is moderate in areas along the route in which noxious weeds are located immediately adjacent to or within the proposed alignment.

SECTION 4

Prevention Measures

The construction contractor will take the following measures to minimize the risk of noxious weed spread.

4.1 Communication with Agencies

- The contractor will contact relevant BLM State Weed Coordinators prior to starting work in each area to discuss specific noxious weed concerns and requirements. Contact names and phone numbers are included in Table 1 at the end of this document.
- The contractor will wash vehicles (see below) after crossing through areas of known weed infestations as determined by agency personnel.
- The contractor will use approved seed mixes for reseeding (see below) as determined by agency and county personnel where reseeding is required.

4.2 Vehicle Washing

- The contractor will wash construction equipment prior to entering each state if coming from out of state, with the exception of moving equipment across the New Mexico/Arizona state line within the Segment 2 ROW.
- The contractor will wash vehicles periodically during construction. Frequency of washing will depend on frequency of weed populations encountered as determined by land management agency personnel. At a minimum, vehicles and construction equipment will be washed before entering the project site for the first time.
- All washing of construction equipment will take place within an approved washing station.

4.3 Construction Techniques

- Ground disturbance will be minimized by the use of the least intrusive construction technique practicable for a given location.
- Off-ROW travel will not be allowed
- The contractor will avoid transporting contaminated materials, such as soils, gravel, mulch, hay/straw and sand.
- Hay and straw used for mulching will be certified by the pertinent state as free as of any noxious weeds.

4.4 Revegatation

- The contractor will reseed disturbed areas as directed by the land management agency with jurisdiction.

- The contractor will use native seed mixes tested free of weed seed for revegetation. No species on the “State Noxious Weed List” will be included in revegetation seed mixes.
- The contractor will confer with the jurisdictional land management agency personnel to determine appropriate seed mixes where reseeding is required. The contractor will use mixes or species recommended by agency personnel within each weed district where available. Native species will be used except in cases where non-persistent exotic species are preferable in order to establish vegetative cover quickly.

SECTION 5

Monitoring and Control

The environmental compliance monitors designated for this project will be qualified to identify the presence or absence of noxious weeds along the proposed route, and existing population of weed infestations will be identified prior to construction. The weed monitor will keep ahead of construction crews to identify areas to avoid or areas of concern. Areas where noxious weeds are prevalent will be flagged so that they are easily identifiable.

TABLE 1
State Noxious Weed Contacts

State	Contact Name	Contact Phone
Texas	Awinash Bhatkar	(512) 463-5025
New Mexico	Bernie Chavez	(505) 438-7668
Arizona	Gina Ramos	(602) 417-9246

TABLE 2
Texas Noxious Weeds (Category Definitions: S1=Prohibited noxious weed seed: highly destructive and difficult to control by ordinary good cultural practice. S2=Restricted noxious weed seed: objectionable in field, lawns, and gardens, but can be controlled by good cultural practices.)

Common Name	Latin Name	Category
Goatgrass	*Aegilops sp.*	S2
Corncockle	*Agrostemma githago*	S2
wild onion	*Allium spp.*	S2
wild oat	*Avena fatua*	S2
feral oat	*Avena sp.*	S2
wild mustards	*Brassica spp.*	S2
hairy chess	*Bromus commutatus*	S2
cheat	*Bromus secalinus*	S2
hedge bindweed	*Calystegia sepium*	S1
balloonvine	*Cardiospermum halicacabum*	S1
Russian knapweed	*Centaurea repens*	S2
Canada thistle	*Cirsium arvense*	S2
blessed thistle	*Cnicus benedictus*	S2

TABLE 2
Texas Noxious Weeds (Category Definitions: S1=Prohibited noxious weed seed: highly destructive and difficult to control by ordinary good cultural practice. S2=Restricted noxious weed seed: objectionable in field, lawns, and gardens, but can be controlled by good cultural practices.)

Common Name	Latin Name	Category
field bindweed	*Convolvulus arvensis*	S1
dodder (other than native spp.)	*Cuscuta spp.*	S2
bermudagrass	*Cynodon dactylon*	S2
yellow nutsedge	*Cyperus esculentus*	S1
purple nutsedge	*Cyperus rotundus*	S1
nutsedge	*Cyperus spp*	S1
wild carrot	*Daucus carota*	S2
quackgrass	*Elytrigia repens*	S2
Texas blueweed	*Helianthus ciliaris*	S2
morningglory	*Ipomoea spp.*	S2
Persian darnel	*Lolium persicum*	S2
poison ryegrass	*Lolium temulentum*	S2
serrated tussock	*Nassella trichotoma*	S1
red rice	*Oryza sativa*	S2
passion flower/maypop	*Passiflora incarnata*	S2
bracted plantain	*Plantago aristata*	S2
buckhorn plantain	*Plantago lanceolata*	S2
annual bluegrass	*Poa annua*	S2
wild radish	*Raphanus raphanistrum*	S2
castorbean	*Ricinus communis*	S1
itchgrass	*Rottboellia cochinchinensis*	S1
giant foxtail	*Setaria faberi*	S2
blessed milkthistle	*Silybum marianum*	S2
Carolina horsenettle	*Solanum carolinense*	S2
silverleaf nightshade	*Solanum elaeagnifolium*	S2
tropical soda apple	*Solanum viarum*	S1
Johnsongrass	*Sorghum halepense*	S2
puncturevine	*Tribulus terrestris*	S2
pocklebur	*Xanthium spp.*	S1

The New Mexico Department of Agriculture has selected the following plant species to be targeted as noxious weeds for control or eradication pursuant to the Noxious Weed Management Act of 1998.

New Mexico s noxious weed list is classified into three divisions: Class A, Class B, and Class C weeds, all of which are non-native to New Mexico. Class A weeds are species that currently are not present in New Mexico or have limited distribution; preventing new infestations of these species and eradicating existing infestations is the highest priority.

Class B weeds are species that are limited to portions of the state. In areas that are not infested, these species should be treated as class A weeds. In areas with severe infestations, management plans should be designed to contain the infestation and stop any further spread.

Class C weeds are species that are wide-spread in the state. Management decisions for these species should be determined at the local level based on feasibility of control and level of infestation.

This list does not include every plant species with a potential to negatively impact the state's environment and economy. Vegetation managers are also encouraged to recognize plant species listed on the federal noxious weed list or other western states noxious weed lists as potentially having negative impacts and to manage them accordingly.

TABLE 3
New Mexico Noxious Weeds

Common Name	Latin Name	Class
Alfombrilla	*Drymaria arenarioides*	A
Black henbane	*Hyoscyamus niger*	A
Camelthorn	*Alhagi pseudalhagi*	A
Canada thistle	*Cirsium arvense*	A
Dalmation toadflax	*Linaria genisitifolia spp. dalmatica*	A
Diffuse knapweed	*Centaurea diffusa*	A
Dyer’s wood	*Isatis tinctoria*	A
Eurasian watermilfoil	*Myriophyllum spicatum*	A
Hoary cress	*Cardaria draba*	A
Hydrilla	*Hydrilla verticillata*	A
Leafy spurge	*Euphorbia esula*	A
Onionweed	*Asphodelus fistulosus*	A
Perennial pepperweed	*Lepidium latifolium*	A
Purple loosestrife	*Lythrum salicaria*	A
Purple starthistle	*Centaurea calcitrapa*	A
Scotch thistle	*Onopordum acanthium*	A
Spotted knapweed	*Centaurea maculosa*	A
Yellow starthistle	*Centaurea solstitialis*	A
Yellow toadflax	*Linaria vulgaris*	A
African rue	*Peganum harmala*	B
Bull thistle	*Cirsium vulgare*	B
Halogeton	*Halogeton glomeratus*	B
Malta starthistle	*Centaurea melitensis*	B
Musk thistle	*Carduus nutans*	B
Russian knapweed	*Acroptilon repens*	B
Poison hemlock	*Conium maculatum L.*	B
Teasel	*Dipsacus fullonum*	B
Field bindweed	*Convolvulus arvensis L.*	C
Jointed goatgrass	*Aegilops cylindrical*	C
Russian olive	*Elaeagnus angustifolia L.*	C
Saltcedar	*Tamarix sp.*	C
Siberian elm	*Ulmus pumila*	C

TABLE 4
Arizona Noxious Weeds (Category Definitions: 1=Regulated noxious weed which is well established and generally distributed in Arizona. 2=Restricted noxious weed which occurs in isolated infestations or very low populations. 3=Prohibited noxious weed which does not occur in Arizona)

Common Name	**Latin Name**	**Category**
puna grass	*Achnatherum brachychaetum*	3
jointed goatgrass	*Aegilops cylindrica*	2
camelthorn	*Alhagi maurorum*	2
alligator weed	*Alternanthera philoxeroides*	3
lens podded hoary cress	*Cardaria chalepensis*	3
hoary cress	*Cardaria draba*	2
hairy whitetop	*Cardaria pubescens*	3
Cardaria complex (combined)	*Cardaria spp.*	2 or 3
plumeless thistle	*Carduus acanthoides*	3
field sandbur	*Cenchrus carolinianus*	1
southern sandbur	*Cenchrus echinatus*	1
purple starthistle	*Centaurea calcitrapa*	3
diffuse knapweed	*Centaurea diffusa*	2
Iberian starthistle	*Centaurea iberica*	3
spotted knapweed	*Centaurea maculosa*	2
Russian knapweed	*Centaurea repens*	2
yellow starthistle	*Centanurea solstitialis*	2
Sicilian starthistle	*Centaurea sulphurea*	3
squarrose knapweed	*Centaurea triumfettii*	3
rush skeletonweed	*Chondrilla juncea*	3
Canada thistle	*Cirsium arvense*	3
field bindweed	*Convolvulus arvensis*	1
creeping wartcress	*Coronopus squamatus*	3
dudaim melon	*Cucumis melo*	3
other than native spp (dodder)	*Cuscuta spp.*	2
sandy drymaria	*Drymaria arenarioides*	3
peacock hyacinth	*Eichhorina azurea*	3
floating waterhyacinth	*Eichhornia crassipes*	2
quackgrass	*Elytrigia repens*	2

TABLE 4
Arizona Noxious Weeds (Category Definitions: 1=Regulated noxious weed which is well established and generally distributed in Arizona. 2=Restricted noxious weed which occurs in isolated infestations or very low populations. 3=Prohibited noxious weed which does not occur in Arizona)

Common Name	Latin Name	Category
leafy spurge	*Euphorbia esula*	3
halogeton	*Halogeton glomeratus*	2
Texas blueweed	*Helianthus ciliaris*	2
waterthyme	*Hydrilla verticillata*	3
morningglory	*Ipomoea spp.*	3
three-lobed morning glory	*Ipomoea triloba*	2
dyer's woad	*Isatis tinctoria*	3
Dalmatian toadflax	*Linaria dalmatica*	2
purple loosestrife	*Lythrum salicaria*	3
burclover	*Medicago polymorpha*	1
serrated tussock	*Nassella trichotoma*	3
Scotch thistle	*Onopordum acanthium*	2
branched broomrape	*Orobanche ramosa*	3
torpedo grass	*Panicum repens*	3
African rue	*Peganum harmala*	3
kikuyugrass	*Pennisetum clandestinum*	3
common purslane	*Portulaca oleracea*	1
Austrian fieldcress	*Rorippa austriaca*	3
tansy ragwort	*Senecio jacobaea*	3
Carolina horsenettle	*Solanum carolinense*	3
perennial sowthistle	*Sonchus arvensis*	3
witchweed	*Striga spp.*	3
water chestnut	*Trapa natans*	3
puncturevine	*Tribulus terrestris*	1

APPENDIX E.

Summary of Floodplain and Waters of the U.S. Sample Locations and Features

Appendix E. Summary of Wetland Points
Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-38-A	38+5000	300A	(13) 338093E 3550756 N	N	Y	Disp-1 P-1	Well defined open sandy channel ~25 feet wide.
S2-39-A	39+0320	300A	(13) 337879E 3550799N	Y	Y	Disp-1 P-2	Well defined open sandy channel ~29 feet wide. Shown as a blue line of the USGS La Mesa Quad.
S2-39-B	39+0920	300A	(13) 337644E 3550848N	N	Y	Disp-1 P4	Well defined open sandy channel ~10 feet wide, to the SW two cahnnels (~3 feet and 5 feet wide) parallel the alignment for approximately 200 feet
S2-39-AA	39+2280	300A	(13) 337322E 3550958N	N	Y	Disk 1 P-1	Open sandy channel with steep cut bank on the east side, ~ 12 feet wide.
S2-39-BB	39+2920	300A	(13) 337182E 3551018N	N	Y	Disk 1 P-2	Open sandy channel with steep cut bank on the east side, ~ 20 feet wide.
S2-39-CC	39+3400	300A	(13) 337013E 3551049	N	Y	Disk 1 P-3	Small open sandy channel ~6 feet wide.
S2-39-DD	39+4280	300A	(13) 336519E 3551133N	N	Y	Disk 1 P-4	Meanderinag open sandy channel ~10 feet wide.
S2-39-D	39+5000	300A	(13) 336564E 3551194N	Y	Y	Disp 1 P-6	Broad sandy channel ~49 feet wide with steep cut banks on the east side. Shown as a blue line on the USGS La Mesa Quad.
S2-40-A	40+0080	300A	(13) 336278E 3551266N	N	Y	Disp 1 P-7	Two open sandy channels that parallel the aliognment; ~10 feet wide by 400 feet long; and ~5 feet wide by 200 feet long.
S2-40-AA	40+2160	300A	(13) 335836E 3551412N	N	Y	Disk 1 P-5	Sandy-gravel ~12 feet wide channel, weakly expressed cut banks in most areas. Debris observed along the fenceline suggests flow in this area.
S2-40-B	40+2960	300A	(13) 335616E 3551455N	N	Y	Disp 1 P-9	Well defined open sandy channel ~ 15 feet wide.
S2-40-C	40+3400	300A	(13) 335380E 3551459N	N	Y	Disp 1 P-10	Shallow open sandy channel ~8 feet wide.
S2-40-BB	40+3800	300A	(13) 335388E 3551546N	N	Y	Disk 1 P-6	Open sandy shannel ~21 feet wide, debris deposits suggest recent flow in this area.
S2-41-AA	41+0560	300B	(13) 334781E 3551727N	N	Y	Disk 1 P-7	Defined open sandy channel ~8 feet wide.
S2-41-BB	41+1440	300B	(13) 334505E 3551832N	N	N	Disk 1P-8	Series of small braided channels, largest ~6 feet wide, smaller channels ~ 1 foot wide. Dissipates into sheet flow only approximately 50 feet north of centerline.
S2-59-A	59+1800	303	(13) 306636E 3560111N	N	Y	Disp 1 P-12	Small open sandy channel ~3 feet wide.
S2-61-A	61+2160	303	(13) 303437E 3561050N	N	Y	Disp 1 P-13	Narrow erosional channle ~2 feet wide
S2-61-AA	61+4600	303	(13) 302969E 3561180N	N	Y	Disk 1 P-12	Open shallow channel ~ 5 feet wide with sand/gravel/cobble substrate
S2-62-AA	62+4160	303	(13) 301345E 3561663N	N	Y	Disk 1 P-13	Defined channel ~ 6 feet wide with cut banks
S2-63-A	63+0840	303	(13) 301000E 3561745N	N	Y	Disp 1P-15	Well defined open sandy channel ~ 3 feet wide.

Appendix E. Summary of Wetland Points

Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-68-AA	62+4640	305	(13) 293915E 3563840N	N	N	Disk 1 P-15	Broad shallow topographic swale
S2-73-AA	73+3280	305	(13) 284648E 3566790N	N	N	Disk 1 P-17	Shallow topographic depression some ponding due to recent precipitation observed at the time of the survey.
S2-76-AA	76+2720	306	(13) 280203E 3568183N	N	N	Disk 1 P-18	Railroad overcrossing south of the study area - no draiange feature present in the study area.
S2-83-AA	83+4080	307	(13) 269113E 3571707N	N	N	Disk 1, P-21&	Railroad overcrossing south of the study area - no draiange feature present in the study area.
S2-84-A	84+4520	307	(13) 267456E 3572230N	N	N	Disp 1 P-16&	Railroad overcrossing south of the study area - no draiange feature present in the study area.
S2-88-AA	88+2400	308	None	N	N	See RH-54	Railroad overcrossing south of the study area - no draiange feature present in the study area.
S2-88-BB	88+4960	308	None	N	N	See RH-54	Railroad overcrossing south of the study area - no draiange feature present in the study area.
S2-89-AA	89+1640	308	(13) 260695E 3574382N	N	N	RH-54	Railroad overcrossing south of the study area - no draiange feature present in the study area.
S2-91-AA	91+0680	309	None	N	N	See RH-53	Railroad overcrossing south of the study area - no draiange feature present in the study area.
S2-92-AA	92+0080	309	(13) 257891E 3575292N	N	N	RH 53	Railroad overcrossing south of the study area - no draiange feature present in the study area.
S2-93-AA	93+2520	309	(13) 254042E 3575579N	N	Y	RH 52	Well defined open sandy channel ~ 15 feet wide.
S2-94-A	94+0080	309	(13) 253342E 3575512N	Y	Y	Disp. 2 P-22	Well defined open sandy chanenl ~ 10 feet wide. Shown as a blue line on the USGS Carne Quad.
S2-94-AA	94+1080	309	(13) 252987E 3575486N	Y	Y	RH-50	Well defined open sandy chanenl ~ 15 feet wide. Shown as a blue line on the USGS Carne Quad.
S2-94-BB	94+3760	309	None	N	N	See RH-49	Railroad overcrossing south of the study area - no draiange feature present in the study area.
S2-95-AA	95+0080	309	None	Y	N	See RH-49	Railroad overcrossing south of the study area - no draiange feature present in the study area. Shown as a blue line on the USGS Deming East Quad.
S2-95-BB	95+2040	309	(13) 251079E 3575319N	Y	N	RH-49	Railroad overcrossing south of the study area - no draiange feature present in the study area. Shown as a blue line on the USGS Deming East Quad.
S2-95-CC	95+4160	309	(13) 250444E 3575264N	N	N	RH-48	Small open sandy drainage channel ~ 3 feet wide, rapidly dissipates into surface flow.

Appendix E. Summary of Wetland Points
Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-96-AA	96+0040	309	(13) 250126E 3575234N	N	N	RH-47	Weakly expressed open sandy channel ~ 5 feet wide, dissipates into sheet flow in the study area.
S2-96-BB	96+2960	310	(13) 249232E 3575176N	N	Y	RH 45&46	Small well defined channel ~ 3 feet wide.
S2-96-A	96+5160	310	(13) 243658E 3574907N	Y	Y	Disp.2 P-18&1	Small channel ~2 feet wide runs north for approximately 15 feet past centerline then turns west an d parallels the alignment for approximately 50 feet. Shown as a blue line on the USGS Deming East Quad.
S2-97-AA	97+1080	310	(13) 248182E 3575068N	Y	Y	RH-44	Series of small braided channels total ~6 feet wide, no defined drainage observed to the south. Shown as a blue line on the Deming East USGS Quad.
S2-97-B	97+2760	310	None	Y	N	None	Railroad overcrossing south of the study area - no draiange feature present in the study area. Shown as a blue line on the USGS Deming East Quad.
S2-98-AA	98+1160	310	(13) 246561E 3575044N	Y	N	RH 42&43	Very weakly expressed swale feature only, somewhat more defined channel south of the study area ~3 feet wide. Shown as a blue line on the USGS Deming East Quad.
S2-98-A	98+2600	310	(13) 246148E 3575045N	N	N	Disp 2 P-16	Series of deeply eroded braided channels total ~ 5 feet wide, continue for approximately 250 feet to the south of the study area and then dissipate into sheet flow only.
S2-98-BB	98+3320	310	(13) 245991E 3575062N	N	N	RH 41	Well defined open sandy channel ~4 wide mostly south of the study area - becomes weakly expressed swale-like feayure only in the study area.
S2-98-CC	98+3720	310	(13) 245813E 3575067N	Y	Y	RH-37&38	Two well defined channels both ~ 12 feet wide. Shown as blue line on the USGS Deming East Quad.
S2-101-A	101+1240	310	(13) 241655E 3575236N	N	Y	Disp 2 P-15	Series of deeply eroded braided channels total ~ 10 feet wide, from the center line continue for approximately 120 feet to the south of the study area and then dissipate into sheet flow only.
S2-101-AA	101+3200	310	(13) 241128E 3575192N	Y	Y	RH 32&33	Mimbres River - opensandy channel ~ 27 feet wide. Blue line on the USGS Deming East Quad.
S2-106-AA	106+0280	311	None	N	N	None	Cement agricultural ditch.
S2-106-BB	106+3360	311	(13) 233581E 3573111N	N	N	Disk 1, P-26	Small impoundment due to roadway - ponded water in this area ssue to recent rainfall events.

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-108-A	108+4160	312	(13) 230220E 3572731N	Y	N	Disk 1, P-20	Very weakly expressed swale featre ~6 feet wide. Shown as a blue line on the USGS Deming West Quad.
S2-109AA	109+1680	312	(13) 229425E 3572604N	Y	N	Disk 1, P-27	Excavated earthen drainage ditch. Shown as a blue line on the USGS Deming West Quad
S2-111-A	111+0000	312	(13) 226726E 3572360N	Y	N	Disp. 1 P-21	Excavated earthen drainage ditch ~4 feet wide. Shown as a blue line on the USGS Williams Ranch Quad
S2-111-AA	111+2440	312	(13) 225968E 3572201N	Y	N	Disk 1, P-29	Excavated earthen drainage ditch. Shown as a blue line on the USGS Williams Ranch Quad
S2-119-AA	119+0200	313	(12) 779255E 3570583N	Y	N	Disk 1, P-32	Cow Springs Draw - No feature observed at this location - shown as a blue line on the USGS Gage Quad.
S2-120-AA	120+2880	314	(12) 776885E 3570162N	N	N	Disk1, P-33	Railroad overcrossing - nop feature observed in the study area.
S2-122-AA	122+1600	314	(12) 774127E 3569688N	Y	N	Disk1, P-34	No feature observed in the study area - shown as a blue line on the USGS Gage Quad.
S2-122-A	122+4880	314	None	Y	N	None	No feature observed - Railroad overcrossing south of the study area - blue line feature shown ont eh USGS Gage Quad.
S2-124-A	124+3480	314	None	Y	N	Disp. 2 P-1	No feature observed - Railroad overcrossing south of the study area - blue line feature shown ont eh USGS Gage NW Quad.
S2-125-AA	125+4800	315	(12) 768390E 3568662N	Y	N	Disk 1, P-36	No feature observed - Railroad overcrossing south of the study area - blue line feature shown ont eh USGS Gage NW Quad.
S2-126-A	126+1640	315	None	Y	N	Disp. 2 P-2	No feature observed - Railroad overcrossing south of the study area - blue line feature shown ont eh USGS Gage NW Quad.
S2-127-AA	127+1920	315	None	Y	N	Disk 1, P-37	No feature observed - Railroad overcrossing south of the study area - blue line feature shown ont eh USGS Gage NW Quad.
S2-127-A	127+4120	315	None	Y	N	Disp. 2, P-5	No feature observed - Railroad overcrossing south of the study area - blue line feature shown ont eh USGS Gage NW Quad.
S2-128-AA	128+3160			Y	N		

Appendix E. Summary of Wetland Points
Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-128-A	128+4760	315	None	Y	N	Disp. 2, P-6	No feature observed - Railroad overcrossing south of the study area - blue line feature shown ont eh USGS Gage NW Quad.
S2-129-A	129+0640	315	None	Y	N	Disp. 2, P-9	No feature observed - Labeled as "China Draw" on the USGS Gage NW Quad.
S2-129-B	129+2160	315	None	Y	N	Disp. 2, P7	No feature observed - Railroad overcrossing south of the study area - blue line feature shown ont eh USGS Gage NW Quad.
S2-129-AA	129+2880	315	(12) 762689E 3567264N	Y	N	Disk 1 P-39	No feature observed - Railroad overcrossing south of the study area - blue line feature shown ont eh USGS Gage NW Quad.
S2-130-AA	130+0560	315	(12) 761800E 3567050N	Y	N	Disk 1, P-40	No feature observed - Railroad overcrossing south of the study area - blue line feature shown ont eh USGS Gage NW Quad.
S2-131-AA	131+0720	315	(12) 760209E 3566647N	Y	N	Disk 2, P-1	No feature observed - Railroad overcrossing south of the study area - blue line feature shown ont eh USGS Gage NW Quad.
S2-132-AA	132+0320	316	(12) 758800E 3566303N	Y	N	Disk 2, P-2	No feature observed - Railroad overcrossing south of the study area - blue line feature shown on the USGS Separ NE Quad.
S2-132-A	132+2720	316	None	Y	N	Disp. 2 P-10	No feature observed - Railroad overcrossing south of the study area - blue line feature shown on the USGS Separ NE Quad.
S2-133-AA	133+1880	316	(12) 756755E 3565789N	Y	N	Disk 2, P-3	No feature observed - Railroad overcrossing south of the study area - blue line feature shown on the USGS Separ NE Quad.
S2-134-AA	134+2280	316	(12) 755109E 3565374N	Y	N	Disk 2, P-4	No feature observed - Railroad overcrossing south of the study area - blue line feature shown on the USGS Separ NE Quad.
S2-134-BB	134+4880	316	(12) 754197E 3565133N	Y	N	Disk 2, P-5	No feature observed - Railroad overcrossing south of the study area - blue line feature shown on the USGS Separ NE Quad.

Appendix E. Summary of Wetland Points
Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-135-AA	135+4240	316	(12) 752939E 3564814N	Y	N	Disk 2, P-6	No feature observed - Railroad overcrossing south of the study area - blue line feature shown on the USGS Separ NE Quad.
S2-136-AA	136+0920	316	None	Y	N	Disk 2, P-7	No feature observed - Railroad overcrossing south of the study area - blue line feature shown on the USGS Separ NE Quad.
S2-136-BB	136+5040	316	(12) 751168E 3564392N	Y	N	Disk 2, P-8	No feature observed - Railroad overcrossing south of the study area - blue line feature shown on the USGS Separ NE Quad.
S2-137-AA	137+2080	316	(12) 750495E 3564210N	Y	N	Disk 2, P-9	No feature observed - Railroad overcrossing south of the study area - blue line feature shown on the USGS Separ NE Quad.
S2-138-AA	138+1080	317	(12) 749153E 3563887N	Y	N	Disk 2, P-10	No feature observed - Railroad overcrossing south of the study area - blue line feature shown on the USGS Separ NE Quad.
S2-138-A	138+2760	317	None	Y	N	Disp. 2 P-11	No feature observed - Railroad overcrossing south of the study area - blue line feature shown on the USGS Separ NE Quad.
S2-138-B	138+3720	317	None	Y	N	Disp. 2 P-12	No feature observed - Railroad overcrossing south of the study area - blue line feature shown on the USGS Separ NE Quad.
S2-139-A	139+0960	317	None	Y	N	See Disp. 2 P	No feature observed - Railroad overcrossing south of the study area - blue line feature shown on the USGS Separ NE Quad.
S2-139-B	139+3280	317	(12) 746999E 3563454N	Y	Y	Disp. 2 P-13	Well defined open sandy channel ~8 feet wide. Shown as a blue line on the USGS Separ Quad.
S2-139-AA	139+3880	317	(12) 746762E 3563462N	Y	N	Disk 2, P-11	No feature observed - Railroad overcrossing south of the study area - blue line feature shown on the USGS Separ Quad.
S2-139-BB	139+4840	317	(12) 746590E 3563518N	Y	N	Disk 2, P-12	Very weakly expressed topographic swale ~ 4 feet wide with upland vegetation. Shown as a blue line on the USGS Separ Quad.
S2-140-AA	140+3400	317	(12) 745534E 3564149N	Y	N	Disk 2, P-13	No feature observed - shown as a blue line on the USGS Separ Quad.

Appendix E. Summary of Wetland Points
Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-141-A	141+3600	317	(12) 744132E 3565079N	Y	N	Disp 2 P-14	No feature observed - - blue line feature shown on the USGS Separ Quad approximately 200 feet north of the study area.
S2-143-AA	143+0240	317	(12) 742524E 3566156N	Y	N	RH-30	No feature observed - - blue line feature shown on the USGS Separ Quad approximately 200 feet north of the study area.
S2-143-A	143+4360	318	(12) 741314E 3567022N	Y	Y	Disk 2 P-14	Well defined open sandy channel ~ 28 feet wide runs parallel to the alignment on the south side of the study area narrows to ~14 feet wide to the west - continues for approximately 2, 720 feet. Shown as a blue line on the USGS Separ Quad.
S2-144-AA	144+0120	318	(12) 741103E 3567135N	Y	Y	RH 2, 3 & 4	Well defined open sandy channel parallel to the alignment ~20 feet wide. Several smaller braided channels from ~6-12 feet flow into this aera from the NE. Shown as a blue line on the USGS Separ Quad.
S2-144-A	144+1760	318	(12) 740649E 3567438N	Y	Y	Disk 2, P-15	Open sandy channel ~ 14 feet wide - continuation of the feature observed at S2-143-A. Shown as a blue line on the USGS Separ Quad.
S2-145-A	145+2680	318	(12) 739080E 3568483N	Y	Y	Disk 2, P-16&	Small ~5-foot wide open sandy channel and weakly expressed open sandy swale ~ 5 feet across. Shown as a blue line on the USGS Separ Quad.
S2-145-AA	145+4360	318	(12) 738638E 3568781E	N	N	RH-6	No feature observed in the study area - railroad overcrossing to the south only.
S2-146-AA	146+2600	318	(12) 737720E 3569399N	Y	N	RH-8	Very weakly expressed swale ~5 feet wide, shown as a blue line on the USGS Separ Quad.
S2-148-AA	148+3720	318	(12) 734773E 3571377N	Y	N	RH-10	Small isolated erosional feature only, no channel or swale observed in the study area. Shown as a blue line on the USGS Lisbon Quad.
S2-149-A	149+0640	318	None	Y	N	Disk 2, P-21	No feature observed - - blue line feature shown on the USGS Lisbon Quad.
S2-149-AA	149+4240	319	(12) 733349E 3572334N	Y	N	RH-11	No feature observed - Railroad overcrossing south of the study area only. Shown as a blue line feature shown on the USGS Lisbon Quad.
S2-150-A	150+0680	319	(12) 732960E 3572656N	Y	Y	Disk 2, P-23	Weakly expressed swale feature ~4 feet wide, runs parallel to the proposed alignment for approximately 300 feet. Shown as a blue line on the USGS Lisbon Quad.

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Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-150-AA	150+2200	319	(12) 732591E 3572883N	Y	Y	RH-12	Well defined open sandy channel ~5 feet wide, debris observed on the fenceline. Shown as a blue line on the USGS Lisbon Quad.
S2-151-AA	151+1160	319	(12) 731434E 3573606N	Y	N	RH-13	No feature observed -shown as a blue line on the USGS Lisbon Quad.
S2-151-BB	151+2680	319	None	Y	N	See Disk 2, P	No feature observed -shown as a blue line on the USGS Lisbon Quad.
S2-151-A	151+4720	319	None	Y	N	Disk 2, P-25	No feature observed - Railroad overcrossing south of the study area only. Shown as a blue line feature shown on the USGS Lisbon Quad.
S2-152-AA	152+1320	319	None	Y	N	See Disk 2, P	No feature observed -shown as a blue line on the USGS Lisbon Quad.
S2-152_A	152+3640	319	(12) 729440E 3574978N	Y	Y	Disk 2, P-26	Well defined open sandy channel ~8 feet wide. Branches into two separate channels to the north ~ 4 feet and ~ 5 feet wide. Shown as a blue line feature on the USGS Lisbon Quad.
S2-153-AA	153+0360	319	(12) 728953E 3575302N	Y	Y	RH-14&15	Two open sandy channels ~11 and ~7 feet wide. Shown as a blue line on the USGS Lisbon Quad.
S2-153-BB	153+1200	319	None	Y	N	None	No feature observed -shown as a blue line on the USGS Lisbon Quad.
S2-153-A	153+2680	319	(12) 728384E 3575684N	Y	Y	Disk 2, P-27	Two open sandy channels, both ~ 4-6 feet wide. Shown as a blue line on the USGS Lisbon Quad.
S2-153-B	153+3480	319	None	Y	N	None	No feature observed -shown as a blue line on the USGS Lisbon Quad.
S2-153-C	153+4360	319	None	Y	N	None	No feature observed -shown as a blue line on the USGS Lisbon Quad.
S2-154-AA	154+0080	319	None	Y	N	None	No feature observed -shown as a blue line on the USGS Lisbon Quad.
S2-154-BB	154+0720	319	(12) 727553E 3576266N	Y	Y	RH-16	Series of sandy braided erosional channels ~4, 5 and 2 feet wide. Shown as a blue line on the USGS Lisbon Quad.
S2-154-CC	154+1760	319	None	Y	N	None	No feature observed -shown as a blue line on the USGS Lisbon Quad.

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Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-154-A	154+2840	319	(12) 726966E 3576654N	Y	Y	Disk 2, P-28	Small open sandy channel ~3 feet wide, from centerline extends appeoximately 150 feet to the north and then dissipates into sheet flow. Shown as a blue line on the USGS Lisbon Quad.
S2-154-DD	154+3400	319	None	Y	N	None	No feature observed, railroad povercrossing south of the study area only. Shown as a blue line on the USGS Lisbon Quad.
S2-154-B	154+4480	319	None	Y	N	None	No feature observed -shown as a blue line on the USGS Lisbon Quad.
S2-155-AA	155+2120	319	(12) 725826E 3577373N	Y	Y	RH-17	Defined open sandy channel ~8 feet wide, small secondary channel ~2 feet wide. Debris line observed on the fence. Shown as a blue line on the USGS Lisbon Quad.
S2-155-BB	155+3240	320	None	Y	N	None	No feature observed -shown as a blue line on the USGS Lisbon Quad.
S2-155-A	155+4440	320	(12) 725262E 3577785N	Y	Y	Disk 2, P-29	Well defined open sandy channel ~10 feet wide, runs parallel to the alignment for approximately 500 feet. Shown as a blue line on the USGS Lisbon Quad.
S2-156-AA	156+0520	320	(12) 724905E 3577983N	Y	Y	RH-18	Well defined open sandy braided erosional channels, main channel is ~ 5 feet wide, secondary channels 1-2 feet wide. Shown as a blue line on the USGS Lisbon Quad.
S2-156-BB	156+1600	320	None	Y	N	None	No feature observed -shown as a blue line on the USGS Lisbon Quad.
S2-157-A	157+0360	320	None	Y	N	Disk 2, P-30	No feature observed -shown as a blue line on the USGS Lisbon Quad.
S2-157-B	157+2120	320	None	Y	N	Disk 2, P-30	No feature observed -shown as a blue line on the USGS Lisbon Quad.
S2-157-AA	157+4200	320	(12) 722452E 3578241N	Y	Y	RH-20 & 21	Shallow, open sandy channel ~5 feet wide. Shown as a blue line on the USGS Lisbon Quad.
S2-158-AA	158+0760	320	(12) 721735E 3578366N	N	N	RH-22	Constructed impoundment area - stock pond.
S2-158-A	158+2280	320	(12) 721148E 3578469N	Y	Y	Disk 2, P-32	Small channel with sandy-gravel substrate ~3 feet wide. Shown as a blue line on the USGS Lordsburg Quad.
S2-158-BB	158+4400	320	(12) 720770E 3578527N	Y	N	RH-23	No feature observed -shown as a blue line on the USGS Lordsburg Quad.

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Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-159-AA	159+0400	320	(12) 720289E 3578667N	Y	N	RH-24	No feature observed -shown as a blue line ("Mudhole Draw") on the USGS Lordsburg Quad.
S2-159-BB	159+3600	320	None	Y	N	See Disk 2, P	No feature observed -shown as a blue line on the USGS Lordsburg Quad.
S2-160-A	160+1680	320	(12) 718529E 3579066N	Y	N	Disk 2, P-33	No feature observed -shown as a blue line on the USGS Lordsburg Quad.
S2-160-AA	160+2680	320	(12) 718117E 3579066N	Y	N	RH-25	No feature observed -shown as a blue line on the USGS Lordsburg Quad.
S2-160-BB	160+4600	320	(12) 717398E 3579033N	Y	N	RH-26	No feature observed -shown as a blue line on the USGS Lordsburg Quad.
S2-160-CC	160+4960	320	(12) 717398E 3579033N	Y	N	RH-26	No feature observed -shown as a blue line on the USGS Lordsburg Quad.
S2-161-A	160+0920	320	(12) 7116974E 3574003N	Y	N	Disk 2, P-34	No feature observed -shown as a blue line on the USGS Lordsburg Quad.
S2-161-B	161+3680	321	(12) 716536E 3578951N	Y	N	Disk 2, P-35	No feature observed -shown as a blue line on the USGS Lordsburg Quad.
S2-162-AA	162+1080	321	(12) 715380E 3579180N	Y	N	RH-28	Constructed drainage ditch ~6 feet wide, upland vegegation such as Yucca and bunchgrasses throughout the channel bottom. Shown as a blue line on the USGS Lordsburg Quad
S2-162-A	162+3920	321	None	Y	N	Disk 2, P-36	No feature observed -shown as a blue line on the USGS Lordsburg Quad.
S2-162-BB	162+4880	321	(12) 714338E 3579574N	Y	Y	RH-29, Disk 2	Well defined channel ~8-10 feet wide, broadens into less defined rocky.gravel swale. Shown as a blue line on the USGS Lordsburg Quad.
S2-163-AA	163+0120	321	None	Y	N	None	No feature observed -shown as a blue line on the USGS Lordsburg Quad.
S2-163-BB	163+2240	321	(12) 713772E 3579976N	Y	Y	RH-31	Well defined open sandy/gravel channel ~30 feet wide. Shown as blue line (No feature observed -shown as a blue line on the USGS Lordsburg Quad.Shakespeare Arroyo") on the USGS Lordsburg Qaud.
S2-163-B	163+3120	321	None	Y	N	Disk 3, P-1	No feature observed -shown as a blue line on the USGS Lordsburg Quad.

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Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-164-AA	164+0640	321	(12) 712588E 3580311N	Y	Y	RH-32	Narrow well defined drainage with sandy/cobble substrate ~5 feet wide. Shown as a blue line on the USGS Lordsburg Quad.
S2-164-A	164+2000	321	(12) 712089E 3580382N	Y	Y	Disk 3, P-2	Well defined open channel ~ 18 feet wide with sandy/gravel substrate. Shown as a blue line on the USGS Lordsburg Quad.
S2-164-BB	164+4000	321	(12) 711608E 3580403N	Y	Y	RH-33	Well defined open sandy channel ~ 6-8 feet wide. Drift lines present. Shown as a blue line on the USGS Gary Quad.
S2-164-CC	164+4520	321	(12) 711429E 3580409N	N	Y	RH-34	Well defined open sandy channel ~6 feet wide.
S2-165-A	165+0000	321	(12) 711227 3580413N	Y	Y	Disk 3, P-3	Open sandy/cobble channel ~4 feet wide. Shown as a blue line on the USGS Gary Quad.
S2-165-AA	165+1840	321	(12) 710723E 3580408N	Y	Y	RH-35 & 36	Well defined channel ~ 6 feet wide within the study area, to the south dissipates into sandy/gravel swale then dissipates into sheet flow. Shown as a blue line on the USGS Gary Quad.
S2-165-BB	165+3720	321	(12) 710157E 3579952N	Y	Y	RH-37	Broad channel ~30 feet wide with scattered upland vegetation, only evidence of recent flow is narrow ~2 feet wide open erosional channel. Shown as a blue line on the USGS Gary Quad.
S2-165-B	165+4360	321	(12) 710085E 3579878N	N	Y	Disk 3, P-5	Open sandy/rocky channel ~6 feet wide, steep cut banks present along parts of the channel.
S2-165-CC	165+5000	321	(12) 709921E 3579799N	Y	Y	RH-38	Sandy/rocky channel ~8 feet wide. Shown as a blue line on the USGS Gary Quad.
S2-166-A	166+1240	321	(12) 709628E 3579634N	Y	Y	Disk 3, P-6	Three sandy/rock channels ranging from ~2-5 feet wide. Shown as a blue line on the USGS Gary Quad.
S2-166-AA	166+2600	321	(12) 709208E 3579254N	Y	Y	RH-39	Two rocky/sandy channels ~ 4-5 feet wide. Shown as a blue line on the USGS Gary Quad.
S2-167-A	167+0040	321	(12) 708627E 3578805N	Y	Y	Disk 3, P-7	Open sandy/gravel channel ~3 feet wide. Shown as a blue line on the USGS Gary Quad.
S2-167-AA	167+0760	321	(12) 708379E 3578655N	Y	Y	RH-40	Open sandy/gravel channel ~5 feet wide. Shown as a blue line on the USGS Gary Quad.
S2-167-BB	167+2720	322	(12) 707844E 3578304N	Y	Y	RH-41	Open sandy/gravel channel ~10 feet wide, to the north becomes series of small ~1-2 feet wide braided channels. Shown as a blue line on the USGS Gary Quad.

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Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-167-CC	167+4200	322	(12) 707501E 3578068N	Y	Y	RH-42	Series of four open braided ersoional channel ~2-4 feet wide. Shown as a blue line on the USGS Gary Quad.
S2-168-AA	168+0040	322	None	Y	Y	See RH-42	Series of well defined open sandy ersoional channels ~2-4 feet wide. Shown as a blue line on the USGS Gary Quad.
S2-168-A	168+3400	322	(12) 706384E 3577317N	Y	Y	Disk 3, P-8	Two open sandy channels seprated by a sand bar, ~10 and ~16 feet wide, channels converge to the north into one ~12-foot wide channel. Shown as a blue line on the USGS Gary Quad.
S2-168-AA	168+4480	322	(12) 705974E 3577093N	Y	Y	RH-43	Series of open sandy braided channels~3 feet wide, merge into single channel ~6-8 feet wide. Shown as a blue line on the USGS Gary Quad.
S2-169-AA	169+2280	322	(12) 705238E 3576578N	Y	Y	RH-45	Open sandy/rocky channel ~13 feet wide, shown as a blue line on the USGS Gary Quad.
S2-169-BB	169+3560	322	(12) 705008E 3576436N	N	Y	RH-44	Small sandy/rocky erosional channel. Blue line shown on USGS Gary Quad to the NW of this feature.
S2-169-CC	169+5000	322	(12) 704539E 3576136N	Y	Y	RH-46	Small open sandy channel ~3 feet wide. Shown as a blue line on the USGS Gary Quad.
S2-170-AA	170+1040	322	(12) 704152E 3575870N	N	Y	RH-47	Well defined channel ~6 feet wide with steep cut banks, runs parallel to the alignment for approximately 2100 feet to S2-170-BB
S2-170-BB	170+2040	322	(12) 704011E 3575774N	Y	N	RH-48	No feature observed - shown as a blue line on the USGS Gary Quad.
S2-171-A	171+4840	322	None	N	N	Disk 3, P-13	Large open playa with erosional rills, scattered patches of bunchgrass and vast expanses of open soils.
S2-172-AA	172+2280	322	(12) 701343E 3573896N	N	N	RH-49	Large open playa with erosional rills, scattered patches of bunchgrass and vast expanses of open soils.
S2-173-AA	173+3520	323	(12) 699739E 3572711N	N	N	RH-1	Large open playa with erosional rills, scattered patches of bunchgrass and vast expanses of open soils.
S2-178-A	178+1920	323	(12) 694149E 3567633N	Y	Y	Disk 3,P-16 &	Open sandy/rocky erosional channel along the south side of the study area, runs parallel to the alignment for approximately 400 feet. Shown as a blue line on the USGS Steins Quad.

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Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-178-AA	178+3680	323	(12) 693199E 3567781N	Y	N	RH-3 & 4	Weakly expressed erosional channels ~3 feet wide with upland vegetation scattered throughout, no evidence of recent flows observed. Shown as a blue line on the USGS Steins Quad.
S2-179-A	179+0480	323	(12) 692903E 3567573N	Y	N	Disk 3, P-18	No feature observed - shown as a blue line on the USGS Steins Quad.
S2-179-AA	179+1160	323	(12) 692229E 3567416N	Y	N	RH-5	Very weakly expressed swale ~2 feet wide, quickly dissipates into sheet flow only. Shown as a blue line on the USGS Steinsr Quad.
S2-179-BB	179+2520	324	None	Y	N	None	No feature observed - shown as a blue line on the USGS Steins Quad.
S2-179-CC	179+4400	324	(12) 691544E 3567210N	Y	N	RH-6	Weakly expressed gravel/rocky swales ~1-2 feet wide. Shown as a blue line on the USGS Steins Quad.
S2-180-A	180+1280	324	(12) 690942E 3567070N	Y	Y	Disk 3, P-19	Shallow open sandy channel ~4 feet wide, to the north
S2-180-B	180+1720	324	(12) 690717E 3566980N	Y	Y	Disk 3, P-20	Open sandy channel ~4 feet wide, becomes series of 1-2 foot braided channels to the north. Shown as a blue line on the USGS Steins Quad.
S2-180-C	180+2360	324	(12) 690599E 3566857N	Y	Y	Disk 3, P-21	Two well defined open sandy channels, each ~4 feet wide. Shown as a blue line on the USGS Steins Quad.
S2-180-D	180+3080	324	(12) 690370E 3566893N	N	Y	Disk 3, P-22	Shallow open sandy channel ~4 feet wide, to the north becomes braided 1-2 feet wide channels.
S2-180-AA	180+3680	324	(12) 690280E 3566882N	Y	N	RH-8	Very weakly expressed ~1 foot wide channels, mostly sheet flow in this area. Shown as a blue line on the USGS Steins Quad.
S2-181-AA	181+0800	324	(12) 689524E 3566806N	Y	Y	RH-9	Series of ~1-2 rocky/sandy braided channels. Shown as a blue line on the Steins Quad
S2-181-A	181+3280	324	(12) 689143E 3566470N	N	Y	Disk 3, P-23	Shallow open sandy channel ~5 feet wide.
S2-182-AA	182+0600	324	None	Y	N	None	Narrow, ~1 foot wide sandy gravel channel. Shown as a blue line on USGS Vanar Quad.
S2-182-A	182+3760	324	(12) 686976E 3566768N	Y	Y	Disk 3, P-24	Steins Creek -large open sandy/gravel channel ~35 feet wide. Shown as a blue line of the USGS Vanar Quad.
S2-183-A	183+0320	324	None	Y	Y	Disk 3, P-25 &	Steins Creek -large open sandy/gravel channel ~35 feet wide. Shown as a blue line of the USGS Vanar Quad.

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New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-184-AA	184+0360	324	(12) 685026E 3566506N	N	Y	RH-13	Series of braided channels ~2-6 feet wide, parallel the alignment fr approximately 800 feet.
S2-184-A	184+5200	324	(12) 683456E 3566255N	Y	Y	Disk 3, P-28	Open sandy/gravel channel ~20 feet wide with smaller ~4 feet wide adjacent channel. Shown as a blue line on the USGS Vanar Quad.
S2-185-A	185+1560	324	None	Y	Y	None	Open sandy/gravel channel ~18 feet wide - continuation of the previous feature. Shown as a blue line on the USGS Vanar Quad.
S2-185-AA	185+4000	325	(12) 682114E 3566126N	Y	Y	RH-14	Well defined open sandy/gravel channel with steep cut banks ~8-12 feet wide. Shown as a blue line on the USGS Vanar Quad.
S2-185-BB	185+4480	325	(12) 681965E 3566106N	Y	Y	RH-15	Two open sandy/gravel channels seperated by a gravel bar, ~ 8 and 3 feet wide, converge into a single ~12-foot wwide channel. Shown as a blue line feature on the USGS Vanar Quad.
S2-186-A	186+1280	325	None	Y	N	None	No feature observed - shown as a blue line on the USGS Vanar Quad.
S2-186-AA	186+3880	325	(12) 680534E 3566135N	Y	Y	RH-16	Shallow open sandy channel ~4 feet wide. Shown as a blue line on the USGS Vanar Quad.
S2-186-BB	186+4880	325	None	Y	Y	None (See RH	Shallow open sandy channel ~4 feet wide. Shown as a blue line on the USGS Vanar Quad.
S2-187-A	187+0720	325	(12) 680132E 3565802N	Y	Y	Disk 4, P-1,2	Several large open sandy/gravel channels ~7,15, 15 and 40 feet wide. Shown as a blue line on the USGS Vanar Quad.
S2-187-B	187+1880	325	None	Y	Y	None (Disk 4,	Shallow, open sandy/gravel channel ~4 feet wide. Shown as a blue line on the USGS Vanar Quad.
S2-187-C	187+2480	325	None	Y	Y	Disk 4, P-4	Shallow, open sandy/gravel channel ~4 feet wide. Shown as a blue line on the USGS Vanar Quad.
S2-187-D	187+4360	325	None	Y	N	None	No feature observed - shown as a blue line on the USGS Vanar Quad.
S2-188-A	188+0720	325	None	N	N	None	No feature observed.
S2-188-B	188+1480	325	None	Y	N	None	No feature observed - shown as a blue line on the USGS Vanar Quad.
S2-189-A	189+2120	325	(12) 676307E 3565245N	N	Y	Disk 4, P-6	Broad shallow open sandy/gravel channel ~20 feet wide.

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New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-189-AA	189+3360	325	(12) 676028E 3565140N	Y	Y	RH-18	Shallow open sandy channel ~8 feet wide. Shown as a blue line on the USGS Vanar NW Quad.
S2-190-AA	190+1840	325	(12) 674896E 3564850N	N	N	RH-19	Small wet meadow area formed as a result of agricultural runoff.
S2-190-A	190+3000	325	(12) 674584E 3564923N	Y	Y	Disk 4, P-7	San Simon River - ~ 8 feet wide, supports narrow band of riparian vegegation, apparent perennial flow due to agricultural run-off. Shown as a blue line on the USGS Vanar NW Quad.
S2-191-A	191+1920	325	None	Y	N	None	No Feature observed - shown as a pond on the USGS Vanar Quad.
S2-193-A	193+3160	326	(12) 670062E 3564268N	N	N	Disk 4, P-8	Weakly expressed swale ~3 feet wide.
S2-193-B	193+4120	326	(12) 669440E 3564152N	Y	Y	Disk 4, P-9	Well defined open channel ~10 feet wide. Shown as a blue line on the Vanar NW quad.
S2-194-A	194+4800	326	(12) 668991E 3564780N	N	Y	Disk 4, P-10	Well defined open sandy channel ~10 feet wide.
S2-195-A	195+3360	326	None	Y	Y	None (Disk 4,	Small sandy/cobble channel ~3 feet wide. Shown as a blue line on the Vanar NW quad.
S2-195-B	195+4640	326	(12) 666132E 3563456N	N	Y	Disk 4, P-11	Open sandy/cobble channel ~5 feet wide.
S2-196-A	196+1080	326	(12) 665743E 3563427N	Y	Y	Disk 4, P-12	Two opend sandy/gravel channels ~5 feet and ~8 feet wide. Shown as a blue line on the Vanar NW quad.
S2-196-AA	196+1600	326	(12) 665461E 3563371N	Y	Y	RH-22	Two opend sandy/cobble channels ~2 feet and ~4 feet wide. Shown as a blue line on the Vanar NW quad.
S2-196-B	196+1600	326	(12) 664906E 3563333N	Y	Y	Disk 4, P-13 &	Three sandy/gravel channels ~8, 16 and 25 feet wide. Shown as a blue line on the Vanar NW quad.
S2-197-A	197+5020	326	(12) 663807E 3563043N	N	Y	Disk 4, P-15	Well defined sandy-cobble channel ~7 feet wide.
S2-197-B	197+2400	327	None	N	Y	None (Disk 4,	Well defined sandy-cobble channel ~5-6 feet wide.
S2-197-C	197+3400	327	None	N	Y	None (Disk 4,	Well defined sandy-cobble channel ~5-6 feet wide.
S2-197-AA	197+4480	327	662922E 3562956N	N	Y	RH-23	Well defined open sandy channel ~10 feet wide.
S2-198-A	198+0600	327	(12) 662650E 3562887N	N	Y	Disp. A P-1	Well defined open sandy channel ~5 feet wide.
S2-198-AA	198+1120	327	(12) 662467E 3562864N	N	Y	RH-24	Well defined open channel ~12 feet wide with sandy/gravel substarte with some cobbles,
S2-198-B	198+4880	327	(12) 661274E 3562546N	N	Y	Disp. A, P-2	Well defined open sandy/gravel braided channels ~6, 16 and 35 feet wide.
S2-199-AA	199+1360	327	(12) 660811E 3562467N	N	Y	RH-25	Small open sandy erosional channel ~2-4 feet wide

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New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-199-A	199+3720	327	(12) 660106E 3562355N	N	Y	Disp. A P-3	Well defined open sandy braided channels ~36, 6 and 8 feet wide.
S2-199-BB	199+4880	327	(12) 659758E 3562356N	N	Y	RH-26	Open sandy channel ~20 feet wide.
S2-200-AA	200+0200	327	None	N	Y	None	Open sandy channel ~6 feet wide.
S2-200-A	200+3920	327	None	N	Y	None (Disp. A	Open sandy channel ~4 feet wide.
S2-200-B	200+5000	327	None	N	Y	Disp. A, P-5	Open sandy channel ~4 feet wide.
S2-201-A	201+0440	327	None	N	Y	Disp. A, P-6	Open sandy channel ~8-10 feet wide.
S2-201-B	201+1640	327	None	N	Y	None (Disp. A	Open sandy channel ~4-5 feet wide.
S2-201-C	201+2520	327	None	N	Y	None	Open sandy cahannel ~25 feet weide, secondary channel ~4 feet wide.
S2-201-AA	201+1400	327	(12) 656839E 3561885N	N	Y	RH-27	Well defined deeply cut channel ~10 feet wide witth sandy/cobble substrate.
S2-202-A	202+0800	327	(12) 656309E 3561808N	N	Y	Disp. A P-7	Open sandy/rocky channel ~7 feet wide.
S2-202-B	202+1760	327	None	N	Y	Disp. A P-8	Well defined channel ~ 10 feet wide with sandy/cobble substrate.
S2-202-AA	202+4040	327	None	N	Y	None (See RH	Well defined channel ~ 5 feet wide with sandy/cobble substrate.
S2-202-BB	202+4440	327	(12) 655019E 3561593N	N	Y	RH-28	Well defined channel ~ 5 feet wide with sandy/cobble substrate.
S2-203-AA	203+0760	327	None	N	Y	None (RH-28)	Well defined channel ~ 5 feet wide with sandy/cobble substrate.
S2-203-A	203+2080	328	(12) 653954E 3561417N	N	Y	Disp. A P-9 &	Well defined braided channels ~ 3, 8, 14 and 23 feet wide with sandy substrate.
S2-203-BB	203+5080	328	(12) 653334E 3561338N	N	Y	RH-29	Well defined channel ~ 8 feet wide with sandy/cobble substrate.
S2-204-AA	204+0240	328	None	N	Y	None (RH-29)	Well defined channel ~ 8-10 feet wide with sandy/cobble substrate.
S2-204-BB	204+1200	328	(12) 652856E 3561247N	N	Y	RH-30	Well defined channel ~ 12 feet wide, to the north becomes braided with ~7 -foot and ~4-foot wide channels. Sandy/gravel substrate.
S2-204-A	204+3160	328	(12) 653200E 3562433N	N	Y	Disp. A P-11	Well defined open sandy channel ~ 20 feet wide, to the north splits into two channels ~8-10 feet wide.
S2-204-B	204+3520	328	None	N	Y	Disp. A P-12	Well defined sandy channel ~12 feet wide with steep cut banks.

Appendix E. Summary of Wetland Points
Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S2-204-C	204+4200	328	None	N	Y	None (Disp A.	Open sandy channel ~5 feet wide.
S2-204-CC	204+5120	328	(12) 651711E 3561062N	N	Y	RH-31	Three open sandy channels ~ 2, 4, and 4 feet wide.
S2-205-AA	205+0200	328	(12) 651545E 3561053N	N	Y	None (RH-31)	Well defined open sandy channel ~4-8 feet wide with steep cut banks.
S2-205-A	205+2560	328	(12) 650918E 3560965N	N	Y	Disp. A P-13	Open sandy/gravel channel ~8 feet wide with areas of steep cut banks on the east side of the channel.
S2-205-B	205+2760	328	None	N	Y	Disp. A P-14	Open sandy channel ~15 feet wide with drift deposits, located within larger ~40-50 feet wide channel.
S2-205-AA	205+0640	328	(12) 650263E 3560820N	N	Y	RH-32	Defined channel ~6 feet wide, sandy/gravel substrate with some cobbles. Scattered upland plants within this channel.
S2-206-A	206+0240	328	(12) 649826E 3560737N	N	Y	Disp. A P-15	Defined channel ~6 feet wide, sandy/gravel substrate with some cobbles. Scattered upland plants within this channel.
S2-206-B	206+1200	328	None	N	Y	Disp. A P-16	Open sandy/gravel channel ~10 feet wide.
S2-206-C	206+1520	328	None	N	Y	Disp. A P-17`	Open sandy/gravel channel ~5 feet wide.
S2-206-AA	206+3280	328	(12) 649055E 3560518N	N	Y	RH-33 & 34	Open sandy/gravel/cobble channel ~8 feet wide located within larger, deeply incised erosional feature ~15 feet wide.
S2-206-D	206+4600	328	(12) 649825E 3560739N	N	Y	Disp. A P-18	Very steep cut erosional feature ~6-8 feet wide.
S2-207-A	207+2000	328	*(12) 647927E 3560503N*	N	Y	None	Broad open sandy channel ~60 feet wide with several smaller ~10-12 feet wide braided channels to the north.
S2-207-B	207+3000	328	*(12) 647740E 3560473N*	N	Y	None	Wide drainage pattern ~500 feet across with several open sandy braided channels ~15 -40 feet wide.
S2-207-C	207+4000	328	*(12) 647288E 3560448N*	N	Y	None	Open sandy channel ~20-25 feet wide
S3-366-A	336+0200	501	(12) 476829E 3594250N	N	N	A P-1	No defined drainage, railroad overcrossing only in this area.
S3-336-B	336+1840	501	(12) 476508E 359492N	Y	Y	A P-2	Open sandy channel, debris line evident on fence. Blue line feature on USGS Marana Quad.
S3-336-C	336+3280	501	(12) 476257E 3594924N	N	N	A P-3	Shallow, weakly expressed swale, lacks hydrology indicators.
S3-336-D	336+4040	501	(12) 476107E 3595126N	N	Y	A P-4	Well defined drainage channel, ~11 feet wide with steep cut banks. Not shhown as a blue line feature on USGS quad map.
S3-337-A	337+1000	501	(12) 475700E 3595699N	Y	Y	A P-5	Open sandy channel, ~10 feet wide with well defined cut banks. Shown as a blue line on USGS Marana Quad.
S3-339-A	339+0280	501	(12) 473988E 3598141N	Y	Y	A P-12, 13	Open sandy channel ~4-8 feet wide. Shown as a blue line on USGS Red Rock Quad.

Appendix E. Summary of Wetland Points
Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S3-339-B	339+1280	501	(12) 473818E 3598397N	Y	Y	A P-14	Open shallow feature ~ 3 feet wide, litter and debris observed on fenceline suggest recent flows. Blue line feature on the USGS Red Rock Quad.
S3-339-B	339+5000	501	(12) 473155E 3599335N	Y	Y	A P-16, 17	Well defined open channel ~10 feet wide, two channels located to tne north flow into this feature(~5 and 9 feet wide).
S3-340-A	340+2800	501	(12) 472636E 3600052N	Y	Y	A P-19	Open sandy channel ~4-6 feet wide. Shown as a blue line on the USGS Red Rock Quad.
S3-340-B	340+5080	501	(12) 472185E 3600664N	Y	Y	A P-20	Shallow, open sandy channel ~13 feet wide. Debris present along fence line within the channel. Shown as a blue line on the USGS Red Rock Quad.
S3-341-A	341+4920	502	(12) 471307E 3601933N	Y	Y	A P-21	Shallow sandy channel ~10 feet wide, some debris observed along fenceline. Shown as a blue line on the USGS Red Rock Quad.
S3-342-A	342+4840	502	(12) 470353E 3603250N	Y	Y	A P-22	Shallow sandy channel ~8 feet wide, some debris observed along fenceline. Shown as a blue line on the USGS Red Rock Quad.
S3-343-A	343+1440	502	(12) 470056E 3603694N	N	Y	A P-23	Defined drainage ~8 feet wide with debris along fenceline, drainage parallel to UPRR on south side of study area. This area not shown as a blue line.
S3-344-A	344+0760	502	(12) 469195E 3604872N	Y	Y	A P-25	Defined open sandy channel ~9 wide. Primary draiage channel runs parallel to the proposed alignment for ~ 1900 feet. Shown as a blue line on the USGS Red Rock Quad.
S3-344-B	344+2720	502	(12) 468897E 3605344N	Y	Y	A P-26	Weakly expressed sandy draiange ~3 feet wide. Shown as small blue line on USGS Red Rock Quad.
S3-344-C	344+4320	502	None	N	N	None	Cement lined irrigation ditch
S3-345-A	345+0480	502	(12) 468547E 3605764N	Y	Y	A P-27	Weakly expressed sandy drainage ~3 feet wide, parallels alignment for ~1200 feet. Shown as small blue line on USGS Red Rock Quad.
S3-345-B	345+2760	502	(12) 467924E 3606618N	Y	N	B P-3	No defined drainage feature observed, sheet flow only in this area - Blue line shown for this area on the USGS Red Rock Quad.
S3-349-A	349+2520	503	(12) 464061E 3611759N	Y	Y	B P-12, 13	Defined erosional feature ~5-10 feet wide, shown as a blue line on the USGS Newman Peak Quad.

Appendix E. Summary of Wetland Points

Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S3-350-A	350+0000	503	(12) 463560E 3612252N	Y	Y	B P-15	McClellen Wash - large open wash with high, steep cuit banks, ~30 to 50 feet wide, runs parallel to the alignment ~20 from the proposed centerline. Shown as a blue line in the USGS Newman Peak Quad.
S3-351-A	351+2280	503	(12) 461691E 3613694N	Y	N	B P-19	No defined channel present, very weakly expressed swale only - shown as a blue line feature on the USGS Newman Peak Quad.
S3-352-A	352+4200	503	(12) 459931E 3615009N	Y	N	B P-23	No defined featured observed in the study area, shown as a blue line on the Newman Peak USGS Quad.
S3-354-A	354+3320	504	(12) 457597E 3616767N	N	N	B P-24	Weakly expressed swale only - not shown as a blue line.
S3-355-A	355+4880	504	(12) 455972E 3618040N	N	N	None	Cement lined irrigation ditch ~25 feet wide
S3-364-A	364+3360	505	None	Y	N	none	Santa Rosa Canal - cement lined canal ~60 feet wide.
S4-386-A	386+4200		(12) 415520E 3647997N	N	N	CP-4, 8	Constructed earthen drainage ditch ~8 feet wide, dry, runs parallel to the alignment for ~ 3 miles.
S4-388-A	388+0000		None	Y	N	None	East Line Canal - cement lined water conveyence canal runs parallel to the south edge of the study limits for ~ 1 mile.
S4-390-A	390+2080		None	N	N	C P-9	Narrow cement lined agricultural irrigation ditch.
S4-390-B	390+3240		None	Y	N	C P-11	East Line Canal - alignment crosses this cement lined water conveyence canal
S4-391-A	391+1200		(12) 411482E 3651642N	Y	Y	C 12, 13	Santa Cruz Wash - No defined channel, feature is ~800 feet wide bounded by two levees, upland vegegation scateerred throughout the wash.
S4-391-B	391+3120		None	Y	N	None	Agricultural irrigation ditch - parallels the proposed alignment within the study limits.
S4-395-A	395+0880		(12) 406758E 3654567N	Y	N	None	No feature observed in this location, discked soils between road and dairy farm - small blue line shown on the USGS Maricopa Quad at this location.
S4-397-A	397+0880		(12) 403650E 3656880N	Y	Y	C-20	Santa Cruz Wash - large open channel, at time of the survey construction work ongoing to stabalized and define the channel in this area total channel ~100 feet wide with gently sloping banks.
S4-398-A	398+3320		(12) 401735e 3658165n	Y	Y	C P-24, 25	Excavated drainage channel ~6 feet wide - appears to be realigned intermittent creek channel. Blue line on the USGS Maricopa Quad.

Appendix E. Summary of Wetland Points
Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S4-401-A	401+4320		(12) 401001E 3662897N	Y	N	D-6	No defined feature at this location, series of small braided channels ~3-4 feet wide, that dissipate into sheet flow. Area is shown as a blue line on the USGS Maricopa Quad.
S4-405-A	405+0760		(12) 400042E 3668093N	Y	Y	D P-12, 13	Santa Cruz Wash - broad open sandy channel ~183 feet wide with several smaller braided channels on the norht side, these tributary channels are ~ 5, 20 and 40 feet wide. Shown as a blue line on the USGS Pima Butte Quad.
S4-406-A	406+2320			Y	Y	D P-16	Well defined drainage channel, ~28 feet wide with steep cut banks. Shown as a blue line feature on the USGS Pima Butte Quad.
S4-406-B	406+3760		(12) 399769E 3670372N	Y	Y	D-17	Well defned drainage channel~18 feet wide with two smaller braided channels both ~10 feet wide. Shown as a blue line on the USGS Pima Butte Quad.
S4-408-A	408+3480		(12) 397869E 3674002N	Y	Y	D 18	Broad shallow sandy channel ~100 feet wide, alignment crossoes this channel again at approximately mile post 409+0560 where the channel is ~110 feet wide.
S4-409-A	409+0560			Y	Y		
S4-411-A	411+120		(12) 396364E 3676902N	Y	Y	D-20	Gila River - (includes also the Canta Cruz Canal and Hoover Ditch) Broad shallow river channel characterized by dense growth of salt cedar throughout - separate defined drainages were not evident in this area. Alignment will transect approximately 1 mile of the river channel.
S4-415-A	414+1000		(12) 393496E 3682394N	Y	N	D-21	No drainage feature observed at this location, sheet flow only. Shown as a blue line on the USGS Laveen Quad.
S4-415-B	415+5080		(12) 392836E 3683664N	Y	Y	D-22	Shallow sandy-gravel channel ~4 feet wide. Shown as a blue line of the USGS Laveen Quad.
S4-416-A	416+0480						Shallow, sandy/gravel channel ~2 feet wide.
S4-416-B	416+1600		(12) 392578E 3684158N	Y	Y	None	Shallow sandy-gravel channel ~3 feet wide. Shown as a blue line of the USGS Laveen Quad.
S4-416-C	416+2920		(12) 392288E 3684484N	Y	Y	None	Shallow sandy-gravel channel ~4 feet wide. Shown as a blue line of the USGS Laveen Quad.
S4-416-D	416+3640		(12) 392177E 3684659N	N	Y	None	Shallow sandy-gravel drainage ~10 feet wide.

Appendix E. Summary of Wetland Points

Kinder Morgan East Line Expansion Project - El Paso to Phoenix

New ID	Mile Post	Map #	GPS (UTM NAD83)	Blue Line?	Waters of the U.S.?	Data Sheet Photo #	Notes
S4-416-E	416+4360		(12) 392126E 3684736N	Y	Y	D 23	Shallow braided channel wiith sandy-gravel substratre tow main channels ~4 feet wide each. Shown as a blue line on the USGS Laveen Quad.
S4-417-A	417-0400		(12) 391730E 3685374N	Y	Y	D 24	Shallow weakly expressed drainage channel ~5 feet wide sandy gravel substrate. Shown as a blue line on the USGS Laveen Quad.
S4-417-B	417+2200		(12) 391480E 3685735N	Y	Y	None	Small weakly expressed drainage channel~3 feet wide, sandy gravel substrate. Shown as a blue line on the USGS Laveen Quad.
S4-418-A	418+0080		(12) 391161E 3686305N	Y	Y	None	Small weakly expressed drainage channel~4 feet wide, sandy gravel substrate. Shown as a blue line on the USGS Laveen Quad.
S4-418-B	418+1200		(12) 391172E 3867010N	Y	Y	D 25	Small weakly expressed drainage channel~3-4 feet wide. Shown as a blue line on the USGS Laveen Quad.
S4-419-A	419+0280		(12) 391177E 3688184N	Y	N	D-4	Earthen agricultural drainage ~6 feet wide runs parallel to the alignment on the west side of the road for approximately 0.5 miles to the north. Shown as a blue line on the USGS Laveen Quad.
S4-190-B	419+2560		(12) 391224E 3691279N	N	N	D-3	Shallow roadside drainage ditch runs south into cement lined ditch on the east side of the road.
S4-420-A	420+0040		(12) 391184E 3689740N	Y	N	None	Cement lined agricultural ditch. Shown as a blue line on the USGS Laveen Quad.
S4-421-A	421+0040		(12) 391200E 3691317N	N	N	D-2	Cement lined agricultural ditch on the west side of the road. Shown as a blue line on the USGS Laveen Quad.

APPENDIX F.

Biological Resources Reconnaissance Survey Results

Appendix F

Biological Resource Reconnaissance Survey Results

Wildlife Species Observed In or Near the SFPP East Line Expansion Line

Common Name	Scientific Name
Segment 1	
Birds	
Western kingbird	*Tyrannus verticalis*
Mammals	
Black-tailed jack rabbit	*Lepus californicus*
Segment 2	
Reptiles	
Western whiptail	*Cnemidophorus tigris*
Zebra-tailed lizard	*Callisaurus draconoides*
Side-blotched lizard	*Uta stansburiana*
Painted Desert glossy snake	*Arizona elegans philipi*
Gopher snake	*Pituophis melanoleucus*
Birds	
Killdeer	*Charadrius vociferus*
Turkey vulture	*Cathartes aura*
Golden eagle	*Aquila chrysaetos*
Red-tailed hawk	*Buteo jamiacensis*
Swainson's hawk	*Buteo swainsoni*
American kestrel	*Falco sparverius*
Prairie falcon	*Falco mexicanus*
Scaled quail	*Callipepla squamata*
Gambel's quail	*Callipepla gambelii*
Rock dove	*Columba livia*
Mourning dove	*Zenaida macroura*
White-winged dove	*Zenaida asiatica*
Greater roadrunner	*Geococcyx californianus*
Western burrowing owl	*Athene cunicularia*
Hummingbird spp.	
Woodpecker spp.	
Western kingbird	*Tyrannus verticalis*

Common Name	Scientific Name
Ash-throated flycatcher	*Myiarchus cinerascens*
Say's phoebe	*Sayornis saya*
Horned lark	*Eremophila alpestris*
Northern rough-winged swallow	*Steigidopteryx serripennis*
Chihuahuan raven	*Corvus cryptoleucus*
Common raven	*Corvus corax*
Verdin	*Auriparus flaviceps*
Cactus wren	*Campylorhynchus brunneicapillus*
Loggerhead shrike	*Lanius ludovicianus*
Northern mockingbird	*Mimus polyglottos*
Curved-bill thrasher	*Toxostoma curvirostre*
European starling	*Strunus vulgaris*
Savannah sparrow	*Passerculus sandwichensis*
Black-throated sparrow	*Amphispiza bilineata*
White-crowned sparrow	*Zonotrichia leucophrys*
Song sparrow	*Melospiza melodia*
Lark bunting	*Calamospiza melanocorys*
Western meadowlark	*Sturnella neglecta*
Brewer's blackbird	*Euphagus cyanocephalus*
Great-tailed grackle	*Quiscalus major*
House finch	*Carpodacus mexicanus*
House sparrow	*Passer domesticus*
Mammals	
Round-tailed ground squirrel	*Spermophilus tereticaudus*
Desert woodrat	*Neotoma lepida*
Desert cottontail	*Sylvilagus audubonii*
Black-tailed jack rabbit	*Lepus californicus*
Antelope jack rabbit	*Lepus alleni*
Coyote	*Canis latrans*
pronghorn	Antilocarpra americana
Mule deer	*Odocoileus hemionus*
Segment 3	
Reptiles	
Western whiptail	*Cnemidophorus tigris*

Common Name	Scientific Name
Mojave rattlesnake	*Crotalus scutulatus*
Birds	
Turkey vulture	*Cathartes aura*
Red-tailed hawk	*Buteo jamiacensis*
American kestrel	*Falco sparverius*
Mourning dove	*Zenaida macroura*
White-winged dove	*Zenaida asiatica*
Gila woodpecker	*Melanerpes uropygialis*
Western kingbird	*Tyrannus verticalis*
Ash-throated flycatcher	*Myiarchus cinerascens*
Chihuahuan raven	*Corvus cryptoleucus*
Common raven	*Corvus corax*
Verdin	*Auriparus flaviceps*
Cactus wren	*Campylorhynchus brunneicapillus*
Gnatcatcher spp.	*Polioptila spp.*
Northern mockingbird	*Mimus polyglottos*
Bendire's thrasher	*Toxostoma bendirei*
Vireo spp.	*Vireo spp.*
Northern cardinal	*Cardinalis cardinalis*
European starling	*Strunus vulgaris*
Great-tailed grackle	*Quiscalus major*
House finch	*Carpodacus mexicanus*
House sparrow	*Passer domesticus*
Mammals	
Round-tailed ground squirrel	*Spermophilus tereticaudus*
Desert woodrat	*Neotoma lepida*
Coyote	*Canis latrans*
Segment 4	
Reptiles	
Western whiptail	*Cnemidophorus tigris*
Western diamondback rattlesnake	*Crotalus atrox*
Birds	
Mourning dove	*Zenaida macroura*
White-winged dove	*Zenaida asiatica*

Common Name	Scientific Name
Red-tailed hawk	*Buteo jamiacensis*
Western kingbird	*Tyrannus verticalis*
Mammals	
Desert cottontail	*Sylvilagus audubonii*
Black-tailed jack rabbit	*Lepus californicus*
Coyote	*Canis latrans*
Wild horse	*Equus caballus*

APPENDIX G.

Special Status Species Eliminated From Further Consideration

APPENDIX G

Special Status Species Eliminated From Further Consideration

Special Status Species eliminated from further consideration: Segment 1, El Paso County, Texas.

Species	Status	Habitat Requirements	Likelihood of Occurrence in the Project Area
Plants			
Sneed pincushion cactus *Coryphantha sneedi*	E	Limestone outcrops and rocky slopes of mountains within the Chihuahuan Desert.	None–Habitat for this species (e.g., limestone outcrops) is not present in the project area.
Birds			
Bald eagle *Haliaeetus leucocephalus*	T	Large trees or cliffs near rivers, reservoirs, and streams with an abundant prey base (e.g., fish and waterfowl).	None–The project area does not have habitat to support either breeding or wintering birds.
Interior least tern *Sterna antillarum anthalassos*	E	Nests on sand bars, alkali flats, and islands.	None–No suitable nesting habitat in the project area.
Mexican spotted owl *Strix occidentalis lucida*	T	Canyons and dense multi-layer forests mixed conifer or ponderosa pine-gambel oak above 4,100 feet.	None - The forested, mountain areas this species requires are not present in or near the Segment 1 project area.
Piping plover *Charadrius melodus*	E	Gravelly shorelines of lakes, river sandbars, and alkali wetlands.	None–Project area in Segment 1 does not contain suitable habitat.
Southwestern willow flycatcher *Empidonax traillii extimus*	E	Dense cottonwood-willow & tamarisk riparian communities. Along rivers and streams.	None–Project area in Segment 1 is lacking the well developed, dense riparian forest required by this species.
Yellow-billed cuckoo *Coccyzus americanus*	C	Riparian forests and woodlands.	None–Vegetation communities in the project area in Segment 1 are not similar to those known to support this species.
Whooping crane *Grus americana*	E	Marshes and prairie potholes supporting prey species: insects, frogs, rodents, and small birds.	None–Project area in Segment 1 does not contain suitable habitat.
Mammals			
Black-tailed prairie dog *Cynomys ludovicianus*	C	Open grasslands; short grass plains including Semidesert Grassland within the Chihuahuan desert.	None–Project area in Segment 1 does not contain suitable habitat.

USFWS categories: Threatened (T), Endangered (E), Proposed (PT, PE), Candidate (C)

Primary sources:

Special Status Species eliminated from further consideration: **Segment 2**, Dona Ana, Luna, and Hidalgo, New Mexico; and Cochise County, Arizona.

Species	Status	Habitat Requirements	Likelihood of Occurrence in the Project Area
Plants			
Canelo Hills ladies'-tresses *Spiranthes delitescens*	E	Known from finely grained, saturated soils of cienagas.	None - This species has a very limited distribution well south of the project area.
Cochise pincushion cactus *Coryphantha robbinsorum*	T	Know from semidesert grassland on gray limestone hills.	None–Gray limestone hills are not present in project area.
Huachuca water umbel *Lilaeopsis schaffneriana ssp. recurva*	E	Cienegas, perennial low gradient streams, wetlands.	None - This species' aquatic habitat is not present in the project area within Segment 2. Habitat for this plant species includes a total of 52 miles of streams or rivers in Cochise and Santa Cruz counties, Arizona; far removed from the project area.
Lemmon fleabane *Erigeron lemmonii*	C	Vertical limestone cliffs above 6,300 feet in pine-oak woodland.	None–Project area in Segment 2 does not contain suitable habitat.
Sneed pincushion cactus *Coryphantha sneedi*	E	This species is known from the Franklin Mountains on limestone soils well east of Segment 2.	None–Project area in Segment 2 does not contain suitable habitat.
Zuni fleabane *Erigeron rhizomatus*	T	Open pinon-juniper woodlands above 7,300 feet.	None–Project area in Segment 2 does not contain suitable habitat.
Fish			
Beautiful shiner *Cyprinella formosa*	T	Streams and ponds; only a few isolated populations remain.	None - This species' aquatic habitat is not present in the project area within Segment 2.
Gila chub *Gila intermedia*	PE	Cienegas and deep pools in smaller headwater streams.	None - This species' aquatic habitat is not present in the project area within Segment 2.
Gila topminnow (incl. Yaqui) *Poeciliopsis occidentalis*	E	Springs, streams, and cienegas.	None - This species' aquatic habitat is not present in the project area within Segment 2.
Loach minnow *Tiaroga cobitis*	T	Small to large perennial streams with swift shallow water over cobble and gravel.	None - This species' aquatic habitat is not present in the project area within Segment 2.

Rio Grande silvery minnow *Hybognathus amarus*	E	Currently limited to the Rio Grande River between Cochiti Dam and Elephant Butte Reservoir.	None - This species' aquatic habitat is not present in the project area within Segment 2.
Spikedace *Meda fulgida*	T	Moderate to large perennial streams with gravel cobble substrates and moderate to swift velocities.	None - This species' aquatic habitat is not present in the project area within Segment 2.
Yaqui catfish *Ictalurus pricei*	T	Streams with slow current over sand and rock bottoms; above 4,000 feet.	None - This species' aquatic habitat is not present in the project area within Segment 2.
Yaqui chub *Gila purpurea*	E	Perennial streams, pools, or ponds near undercut banks; above 4,000 feet.	None - This species' aquatic habitat is not present in the project area within Segment 2.
Zuni bluehead sucker *Catostomus discobolus yarrowi*	C	Shaded pools in rivers.	None - This species' aquatic habitat is not present in the project area within Segment 2.
Amphibians			
Chiricahua leopard frog *Rana chiricahuensis*	T	Streams, rivers, backwaters, and ponds.	None - This species' aquatic habitat is not present in the project area within Segment 2.
Sonoran tiger salamander *Ambystoma tigrinum stebbinsi*	E	Know from stock tanks and impounded cienegas in Huachuca Mountains.	None - This species' aquatic habitat is not present in the project area within Segment 2.
Reptiles			
New Mexico ridge nosed rattlesnake *Crotalus willardi obscurus*	T	Known from pine-oak vegetative communities in mountains above 5000 feet.	None–The project area is situated below 5000 feet in basin bottoms.
Birds			
Bald eagle *Haliaeetus leucocephalus*	T	Large trees or cliffs near rivers, reservoirs, and streams with an abundant prey base (e.g., fish and waterfowl).	None–The project area does not have habitat to support either breeding or wintering birds. Perennial waters with associated prey base are not present.
California brown pelican *Pelecanus occidentalis californicus*	E	Coastal and islands; in Arizona occurs around lakes and rivers.	None - Suitable coastal habitat is not present. Only possibility of occurring in project area would be when blown far inland from a storm.
Least tern *Sterna antillarum*	E	Nests on sand bars, alkali flats, and islands.	None–Suitable habitat is not present.

Mexican spotted owl *Strix occidentalis lucida*	T WCSA	Canyons and dense multi-layer forests mixed conifer or ponderosa pine-gambel oak above 4,100 feet.	None - The forested mountain areas this species requires are not present in or near the project area.
Southwestern willow flycatcher *Empidonax traillii extimus*	E WSCA	Dense cottonwood/willow & tamarisk riparian communities. Along rivers and streams.	None–The project area is lacking the well developed, dense riparian forest required by this species.
Yellow-billed cuckoo *Coccyzus americanus*	C	Riparian forests and woodlands.	None–Vegetation communities in the project area are not similar to those known to support this species.
Mammals			
Black-footed ferret *Mustela nigripes*	E	Grasslands supporting prairie dog colonies, on which black-footed ferrets depend.	None - This species has been extirpated from New Mexico and southeast Arizona. Further, the project area is not suitable for re-introductions of this species.
Black-tailed prairie dog *Cynomys ludovicianus*	C	Open grasslands; short grass plains including Semidesert Grassland within the Chihuahuan desert.	None - This species has been extirpated from New Mexico and southeast Arizona. Also, the project area is not suitable for re-introductions of this species given the absence of prairie dog colonies, on which black-footed ferrets depend.
Mexican gray wolf *Canis lupus*	E	Chaparral, woodland, and forested areas.	None–The vegetation communities in the project area are not similar to those where this species typically would occur. The species has been extirpated from the area.

USFWS categories: Threatened (T), Endangered (E), Proposed (PT, PE), Candidate (C)
NMDGF category: New Mexico Threatened (NM-T)
AGFD category: Wildlife Species of Concern in Arizona (WSCA)
Primary sources: USFWS database (http.//ifw2es.fws.gov/EndangeredSpecies/lists/)

Special Status Species eliminated from further consideration: Segment 3, Pima and Pinal Counties, Arizona

Species	Status	Habitat Requirements	Likelihood of Occurrence in the Project Area
Plants			
Arizona hedgehog cactus *Echinocereus triglochidiatus var. arizonicus*	E	Open slopes in areas of boulder in ecotonal areas between chaparral and woodlands above 3,700 feet.	None - Species distribution is well north of the project area in mountains with woodland and chaparral vegetation.

Special Status Species eliminated from further consideration: Segment 3, Pima and Pinal Counties, Arizona

Species	Status	Habitat Requirements	Likelihood of Occurrence in the Project Area
Goodings onion *Allium goodingii*	CA	This species is found above 7,500 feet in mixed coniferous and spruce forests.	None–Project area at much lower elevation and well removed from forest habitat.
Huachuca water umbel *Lilaeopsis schaffneriana ssp. recurva*	E	Cienegas, perennial low gradient streams, wetlands.	None - No perennial water sources, stock tanks, or impounded cienegas present within the project area.
Kearney's blue-star *Amsonia kearneyana*	E	The distribution and habitat of this species is the west-facing drainages of the Baboquivari Mountains in riparian forests	None–The project area is well removed from riparian forests in the Baboquivari Mountains.
Nichol's Turk's head cactus *Echinocactus horizonthalonius nicholii*	E	Found 3,000 and 3,500 feet elevation at the base of limestone mountains.	None–Required limestone soils are not present in the project area.
Pima pineapple cactus *Coryphantha scheeri robustispina*	E	Sonoran desertscrub or semi-desert grassland communities.	None**–**Known distribution is well south of the project area.
Invertebrates			
San Xavier talussnail *Sonorella eremita*	CA	Species known geographic range and habitat is one hillside in south Tucson.	None–The project area is well removed from the species hillside habitat in south Tucson.
Fish			
Desert pupfish *Cyprinodon macularius*)	E	Springs, streams, and marshes.	None - This species' aquatic habitat is not present in the project area within Segment 3.
Gila chub *Gila intermedia*	PE	Cienegas and deep pools in smaller headwater streams.	None - This species' aquatic habitat is not present in the project area within Segment 3.
Gila topminnow *Poeciliopsis occidentalis*	E	Springs, streams, and cienegas.	None - This species' aquatic habitat is not present in the project area within Segment 3.
Loach minnow *Tiaroga cobitis*	T WSCA	Small to large perennial streams with swift shallow water over cobble and gravel.	None - This species' aquatic habitat is not present in the project area within Segment 3.
Razorback sucker *Xyrauchen texanus*	E	Major rivers and reservoirs in slow moving water.	None - This species' aquatic habitat is not present in the project area within Segment 3.

Special Status Species eliminated from further consideration: Segment 3, Pima and Pinal Counties, Arizona

Species	Status	Habitat Requirements	Likelihood of Occurrence in the Project Area
Spikedace *Meda fulgida*	T WSCA	Moderate to large perennial streams with gravel cobble substrates and moderate to swift velocities.	None - This species' aquatic habitat is not present in the project area within Segment 3.
Amphibians			
Chiricahua leopard frog *Rana chiricahuensis*	T	Streams, rivers, backwaters, and ponds.	None - This species' aquatic habitat is not present in the project area within Segment 3.
Reptiles			
Sonoyta mud turtle *Kinosternon sonoriense longifemorale*	C	Occurs only in pond and stream habitat a Quitobaquito Springs in Organ Pipe Cactus National Monument and nearby Mexico.	None –The only known location and habitat requirements of this subspecies are far removed from the project area.
Birds			
Bald eagle *Haliaeetus leucocephalus*	T WSCA	Large trees or cliffs near rivers, reservoirs, and streams with an abundant prey base (e.g., fish and waterfowl).	None–The project area does not have habitat to support either breeding or wintering birds. Perennial waters with associated prey base are not present.
California Brown pelican *Pelecanus occidentalis californicus*	E	Coastal and islands; in Arizona occurs around lakes and rivers	None - Suitable coastal habitat is not present. Only possibility of occurring in project area would be when blown far inland from a storm.
Masked bobwhite *Colinus virginianus ridgewayi*	E	Desert grasslands, the Arizona population is currently limited to the Buenos Aires National Wildlife Refuge.	None - The current known range, the Buenos Aires National Wildlife Refuge, is well south of the project area.
Mexican spotted owl *Strix occidentalis lucida*	T WCSA	Canyons and dense multi-layer forests mixed conifer or ponderosa pine/gambel oak above 4,100 feet.	None - The forested mountain areas this species requires are not present in or near the project area.
Southwestern willow flycatcher *Empidonax traillii extimus*	E WSCA	Dense cottonwood/willow & tamarisk riparian communities. Along rivers and streams.	None–Project area is lacking the dense riparian forest habitat required by this species.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	C	Riparian forests and woodlands.	None–Vegetation communities in the project area are not similar to those known to support this species.

Special Status Species eliminated from further consideration: Segment 3, Pima and Pinal Counties, Arizona

Species	Status	Habitat Requirements	Likelihood of Occurrence in the Project Area
Yuma clapper rail *Rallus longirostris yumanensis*	E	Nests primarily in freshwater marshes in mature cattail-bulrush habitat.	None–The isolated wetland habitats occupied by this subspecies do not occur in project area.
Mammals			
Mexican gray wolf *Canis lupus baileyi*	E	Chaparral, woodland, and forested areas.	None–The non-forest vegetation communities in the project area are not similar to those where this species typically occurs.
Ocelot *Leopardus pardalis*	E	Known from heavily vegetated areas of humid tropical and sub-tropical areas.	None–Project area is relatively arid and sparsely vegetated.
Sonoran pronghorn *Antilocapra americana sonoriensis*	E	Intermountain basins in southwestern Arizona.	None–Project area is outside of geographical range. Sonoran pronghorn do not occur west of SR 85; they are restricted to southwest portion of the state.

USFWS categories: Threatened (T), Endangered (E), Proposed (PT, PE), Candidate (C).

AGFD Category: Wildlife Species of Concern in Arizona (WSCA).

Primary sources: USFWS database (http.//ifw2es.fws.gov/EndangeredSpecies/lists/).

Special Status Species eliminated from further consideration: Segment 4, Maricopa and Pinal Counties, Arizona.

Species	Status	Habitat Requirements	Likelihood of Occurrence in the Project Area
Plants			
Arizona agave *Agave arizonica*	E	This species occurs at 3,600-5,800 feet in chaparral or juniper vegetation.	None - No suitable habitat in the project area.
Arizona cliffrose *Purshia subintegra*	E	Limestone deposits above 4,000 feet in chaparral vegetation.	None - This species habitat and distribution is well north of the project area in isolated areas of chaparral in northern most Maricopa County.
Arizona hedgehog cactus *Echinocereus triglochidiatus var. arizonicus*	E	This species occurs in chaparral areas between 3,000 and 3,500 feet elevation	None - This species distribution is well north of the project area in mountains with woodland and chaparral vegetation.
Nichol's Turk's head cactus *Echinocactus horizonthalonius nicholii*	E	Found 3,000 and 3,500 feet elevation at the base of limestone mountains.	None–No suitable habitat in the project area (e.g., limestone soils).
Fish			
Desert pupfish (*Cyprinodon macularius*)	E	Springs, streams, and marshes.	None - This species' aquatic habitat is not present in the project area within Segment 4.

Special Status Species eliminated from further consideration: Segment 4, Maricopa and Pinal Counties, Arizona.

Species	Status	Habitat Requirements	Likelihood of Occurrence in the Project Area
Gila chub *Gila intermedia*	PE	Cienegas and deep pools in smaller headwater streams.	None - This species' aquatic habitat is not present in the project area within Segment 4.
Gila topminnow *Poeciliopsis occidentalis*	E	Springs, streams, and cienegas.	None - This species' aquatic habitat is not present in the project area within Segment 4.
Loach minnow *Tiaroga cobitis*	T WSCA	Small to large perennial streams with swift shallow water over cobble and gravel.	None - This species' aquatic habitat is not present in the project area within Segment 4.
Razorback sucker *Xyrauchen texanus*	E	Major rivers and reservoirs in slow moving water.	None - This species' aquatic habitat is not present in the project area within Segment 4.
Spikedace *Meda fulgida*	T WSCA	Moderate to large perennial streams with gravel cobble substrates and moderate to swift velocities.	None - This species' aquatic habitat is not present in the project area within Segment 4.
Birds			
Bald eagle *Haliaeetus leucocephalus*	T WSCA	Large trees or cliffs near rivers, reservoirs, and streams with an abundant prey base (e.g., fish and waterfowl).	None–The project area does not have habitat to support either breeding or wintering birds. Perennial waters with associated prey base are not present.
California brown pelican *Pelecanus occidentalis californicus*	E	Coastal and islands; in Arizona occurs around lakes and rivers.	None - Suitable coastal habitat is not present. Only possibility of occurring in project area would be when blown far inland from a storm.
Mexican spotted owl *Strix occidentalis lucida*	T WCSA	Canyons and dense multi-layer forests mixed conifer or ponderosa pine-gambel oak above 4,100 feet.	None - The forested mountain areas this species requires are not present in or near the project area.
Southwestern willow flycatcher *Empidonax traillii extimus*	E WSCA	Dense cottonwood-willow and tamarisk riparian communities in conjunction with perennial rivers and streams.	None–Project area is lacking the well developed, dense riparian forest required by this species.
Yellow-billed cuckoo *Coccyzus americanus*	C	Riparian forests and woodlands.	None–Vegetation communities in the project area are not similar to those known to support this species.
Yuma clapper rail *Rallus longirostris yumanensis*	E	Nests primarily in freshwater marshes in mature cattail-bulrush habitat.	None–The isolated wetland habitats occupied by this subspecies are well removed from project area.

Special Status Species eliminated from further consideration: Segment 4, Maricopa and Pinal Counties, Arizona.

Species	Status	Habitat Requirements	Likelihood of Occurrence in the Project Area
Mammals			
Sonoran pronghorn *Antilocapra americana sonoriensis*	E	Intermountain basins in southwestern Arizona.	None–Project area is outside of this species geographic range. Sonoran pronghorn do not occur west of SR 85; they are restricted to southwest portion of the state.

USFWS categories: Threatened (T), Endangered (E), Proposed (PT, PE), Candidate (C).

AGFD Category: Wildlife Species of Concern in Arizona (WSCA).

Primary sources: USFWS database (http.//ifw2es.fws.gov/EndangeredSpecies/lists/).

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APPENDIX H.

Complete Chronological Cultural History

Complete Chronological Cultural History for the SFPP East Line Expansion Project El Paso to Phoenix

Since the current project crosses a vast extent of the southern Southwest, the project area includes evidence of many cultures. Archaeologists have devised various frameworks to address culture history in the region. There are similarities across the region in the Paleoindian and Archaic period, but later prehistory exhibits greater variability. It is therefore necessary to discuss the Archaic and later periods in a more detailed way for the sub-regions of this project.

1.1 Paleoindian Period (10,000–6000 BC) Texas New Mexico and Arizona

During the Paleoindian period, the local climate was cooler and moister than today, with somewhat more lush vegetation and a smattering of now-evaporated lakes. Under these less arid conditions, the environment of the southern Southwest was not a harsh as it is today. Now-extinct Pleistocene megafauna inhabited the area and were game for Paleoindian hunters. Low population densities prevailed among the early inhabitants of the region, and they were apparently organized as small-scale, mobile, and socially fluid groups. These conditions worked to homogenize projectile point styles and other cultural marker traits over vast areas.

Clovis Complex (ca. 9500–9000 BC). The distinctive marker of the Clovis complex is the fluted lanceolate projectile point, first identified in eastern New Mexico. Patterns of Clovis sites indicate low population densities, with small-scale and dispersed, highly mobile bands that inhabited large home ranges, trading and interacting extensively with other groups. Clovis materials may represent an adaptation to "high-diversity environments south of the maximum extent of the Wisconsin glaciation…primarily in mountain settings" (Bronitsky and Merritt, 1986:73). Several isolated Clovis points have been found in southern New Mexico (Huckell, 1972). Clovis culture is also relatively well documented in southeastern Arizona. In Cochise County, Clovis artifacts have been found in primary contexts at several sites in the upper San Pedro Valley, and isolated Clovis projectile points have been recovered from other locations in the region.

Folsom Complex (ca. 9000–8000 BC). The Clovis complex was followed by the Folsom complex (ca. 9000–8000 BC), which is also named for a distinctive fluted projectile point, first identified in northeastern New Mexico (Wheat, 1972). Following the extinction of mammoths, a relatively homogeneous Pleistocene environment in western North America evolved into different environments characterized by distinct floral and faunal assemblages. Most archaeological evidence supports the view that Folsom people were primarily bison hunters (Amick, 1994; Figgins, 1927; Judge, 1973; Staley and Turnbow, 1995). Folsom sites include isolated projectile points, small kill sites, butchering stations, and other modest site types (Krone, 1975). Several sites have been recorded in the desert lowlands along the shorelines of ancient lakes or modern playas (Beckes et al., 1977; Peter and Mbutu, 1993;

Zeidler et al, 1996). Other locations include caves, canyons, and foothills that may have been base camps (Carmichael, 1986). In southwestern New Mexico, Folsom material is well represented in the Tularosa Basin, to the east and north of El Paso and the Franklin and Organ Mountains (Amick, 1994; Beckett, 1983; Carmichael, 1986).

Plano Complex (ca. 8000–6000 BC). Evidence of increasingly drier conditions appears around 10,000 years ago (Judge and Dawson, 1972; Peter and Mbutu, 1993). Adaptive changes to this more xeric environment area associated with the emergence of the Plano complex (8000–6000 BC). Adaptive changes to this more xeric environment are associated with the emergence of the Plano complex. Plano sites tended to be located in areas with relatively easy access to increasingly restricted water sources. Communal hunting techniques were employed and focused primarily on bison (Carmichael, 1983, 1986; Cordell, 1997; Wheat, 1972). Technologically, projectile points were laterally thinned (e.g., Midland and Plainview), basally constricted (e.g., Agate basin and Hell Gap), and basally indented (e.g., Firstview and Cody).

1.2 Archaic Period in Texas (6000 BC-AD 200)

The Archaic period in Texas may be divided into four phases and include Gardner Springs (6000 BC to 4300 BC); Keystone (4300 BC to 2600 BC); Fresnal (2600 BC to 900 BC), and Hueco (900 BC to AD 200) (MacNeish, 1993).

Gardner Springs Phase (6000-4300 BC). The Gardner Springs phase, is the least understood of the four Archaic stages. Jay, Abasolo, and Bajada projectile point styles are identified with this early assemblage (Anderson, 1987; Beckett and MacNeish, 1994). MacNeish (1993) also included end scrapers, flake gravers, denticulates, prismatic blades, choppers, mullers, pebble cleavers, milling stones, and pestles in the assemblage. Preliminary settlement pattern data suggest small bands exploited a variety of microenvironmental zones in the late spring and early summer as seasonal resources became available. During the fall, small groups would also use a variety of habitats including riverine, basin floors, and mountain terrains. Winter sites tended to be associated with basin floor playas. Because acorns and pinyon nuts could be stored in the winter, some sites tended to be in higher elevations in the fall (Beckett and MacNeish, 1994; MacNeish, 1993). Consequently, it is possible that mountain rock shelters were occupied during the fall and winter.

Keystone Phase (4300-2600 BC). Settlement patterns remained fairly static throughout the Gardner Spring phase and into the subsequent Keystone phase. Winter sites are found on the basin floors and along the river, and a variety of habitats were exploited the remainder of the year. For example, the Keystone Dam Site contains a structure tentatively dated to the latter part of this phase and may reflect a winter occupation (O'Laughlin, 1980). The presence of habitation units may indicate an increase in population, social stress, climatic changes, or a combination of these influences. The Keystone phase is associated with projectile point styles such as Bat Cave, Pelona, Shumla, Gypsum-Almagre, Amargosa, and Todsen.

Fresnal Phase (2600-900 BC). More archeological data are available for the Fresnal phase than the previous two phases. During this phase, settlement patterns shifted from a seasonal to a semi base camp strategy. Short-term or specialized task groups exploited a variety of resources from a central base camp (Binford, 1980). The earliest radiocarbon dates on corn for the region indicate that cultigens had been introduced by the Fresnal phase (Tagg, 1996).

The large number of identified Fresnal phase sites suggests a significant population increase. The projectile points affiliated with this phase include Fresnal, San Jose, Todsen, Augustin, and Chiricahua (Beckett and MacNeish, 1994; MacNeish, 1993).

Hueco Phase (900 BC-AD 200). The succeeding Hueco phase population may have utilized an increasingly mixed economy. Seasonal, short-term base camps appear to be associated with specialized task groups exploiting a variety of habitats. The addition of squash and beans to the list of documented cultigens implies expanding horticultural pursuits and may reflect a shift towards more semi permanent occupations. In addition, large numbers of Hueco sites, found in a variety of habitats, indicate expanded land-use patterns. Projectile point styles identified with this Late Archaic phase include Hueco, San Pedro, Armijo, and Hatch (Beckett and MacNeish, 1994). The Hueco phase people may have set the foundation for strategies employed by later Mesilla phase groups.

1.3 Archaic Period in New Mexico (6000 BC–AD 200)

The presence of distinct projectile point styles and the absence of ceramic technology define the Archaic period in New Mexico. The Archaic period in southwestern New Mexico is the Cochise tradition (Huckell, 1996; Irwin-Williams, 1979; Sayles and Antevs, 1941). The Cochise tradition is subdivided into Sulphur Spring phase (6000–3500 BC), Chiricahua (3500-1500 BC), San Pedro (1200–800 BC) and Cienega (800 BC–AD 200).

Sulphur Spring Phase (ca. 6000–3500 BC). The Sulphur Spring phase was identified at sites along Whitewater Draw and Wilcox Playa in the Sulphur Spring Valley of southeastern Arizona. This phase is marked archaeologically by simple ground stone milling tools (e.g., grinding slabs) and crudely flaked stone tools, with a distinctive lack of projectile points (Waters, 1998).

Chiricahua Phase (3500–1500 BC). Dating of the Chiricahua phase is problematic, and is well known only from about 3500 BC; Whalen dates the phase to 3500–1500 BC (Whalen, 1971). An increasing variety of mano forms, crude flaked stone tools, and projectile points mark the Chiricahua phase. Among the projectile points associated with this phase are side-notched points that have been called Chiricahua points (Huckell, 1996). Sites are generally small, with low densities of artifacts and features. Maize remains appear in the archaeological record by 2000 BC, but archaeologists generally assume that maize contributed little to the diet (Wills, 1988).

San Pedro Phase (1200–800 BC). The San Pedro phase is marked by the appearance of large sites with substantial midden deposits, abundant artifacts, fire-cracked rock, storage pits, and shallow pit structures. An increased frequency of projectile points has been observed for this period. The most common of these point types is the San Pedro, which typically exhibits broad, lateral notching. Archaeologists have long known that maize was present in this period, with early discoveries at sites such as Ventana Cave and Bat Cave. As is the case with the preceding Chiricahua phase, however, archaeologists have long assumed that cultivation of maize was a minor activity within a subsistence economy still dominated by hunting and gathering.

Cienega Phase (800 BC–AD200). Huckell (1995) identified the Cienega phase in southeastern Arizona. It is marked by flaked stone similar to that of the San Pedro phase, except for the presence of distinctive, diagonally corner-notched points. This point type is named

Cienega, and is considered the diagnostic lithic element of the Cienega phase. Ground stone includes large perforated stone rings whose function is not known. Structures are round and do not contain bell-shaped pits. Maize, possibly squash, and native plant remains have been recovered from sites of this period (Huckell, 1996).

Introduction of Agriculture in the Late Archaic. Investigating sites with substantial midden deposits and pit structures, Huckell's team routinely collected and processed flotation and pollen samples, and they found that maize remains were both abundant and ubiquitous in these sites. Apparently, the Late Archaic inhabitants were investing considerable energy in maize farming, although hunting and gathering remained important. Moreover, the substantial midden deposits at the site, along with the presence of pit structures, indicated a significant residential commitment to these sites, with at least semi-sedentary occupations.

Huckell's findings present a picture of the Late Archaic period that differs from what had been assumed, and Huckell proposes that the period 1500 BC–AD 200 be re-defined as the "Early Agricultural period" rather than Late Archaic. Yet, it remains unclear to what extent intensive maize farming, as documented at the Cienega Valley sites, may characterize this time across the region. Huckell himself acknowledged this issue and questioned whether intensive maize agriculture was a generalized economic pattern at this time or was restricted to more favorable environments, such as the alluvial bottoms of the Cienega Valley.

1.4 Archaic Period in Arizona (7500/6900 BC–AD 1/600)

The Archaic period in Arizona is characterized as a time of increasing sophistication in hunting and gathering techniques through both technological development and the evolution of ever more complex subsistence-settlement systems, in conjunction with a gradually increasing dependence upon native plants as a food resource. A transition to a partial reliance on agriculture accompanied population growth and the development of more sedentary settlement patterns. Archaic occupation of southern Arizona has been associated with two broad traditions: the Cochise culture and the Amargosa complex. The former was first defined by Sayles and Antevs (1941; Sayles, 1983) in the San Pedro, Sulphur Springs, and San Simon valleys. Within this tradition, three successive phases were recognized: Sulphur Springs, Chiricahua, and San Pedro. The Amargosa tradition was initially identified in the Mojave Desert of California and adjacent parts of the Great Basin (Haury, 1950; Hayden, 1970, 1976; Rogers, 1966). The Cochise culture corresponds to the Southern cultural tradition of the Archaic as defined by Irwin-Williams (1979), whereas the Amargosa Complex corresponds to her Western tradition (Huckell, 1984).

Since the mid-1980s, a simpler chronological taxonomy—Early, Middle, and Late Archaic—has been widely used (Huckell, 1995). In Huckell's (1996) chronology, the Early Archaic dates from ca. 7500/6900-4300 BC, although radiocarbon dates (Haynes, 1982; Huckell and Haynes, 1995; Waters, 1986) "indicate that the Archaic may have begun earlier in southern Arizona, overlapping with Paleoindian complexes in the early Holocene" (Mabry, 1998:10). Huckell (1996) dates the Middle Archaic from ca. 4300 to 1800 BC. For the succeeding period, from ca. 1800 to AD 1/600, he differentiates between Late Archaic populations that maintained a hunting and gathering lifeway and Early Agricultural populations. In southern Arizona, maize was introduced from Mesoamerica ca. 1700 BC, followed by squash (ca. 1000 BC) and beans (ca. 600 BC) (Mabry, 1998). Wild floral resources, as well as game, continued to be major components of subsistence (Huckell and Huckell 1984; Huckell et al. 1994). Within the Early Agricultural period, two phases have been recognized: the San Pedro (ca. 1200-800 BC) and the Cienega (ca. 800 BC-AD 200) (Huckell, 1995).

1.5 Jornada Mogollon (Formative Period [A.D 200–1450]) New Mexico and Texas

The Southern Mogollon tradition is found in the project area in New Mexico from around Deming to the Arizona-New Mexico state line (Lehmer, 1948). Around Deming the Mogollon tradition is Jornada. Below is both the Jornada and followed by the Southern Mogollon.

The Jornada Mogollon is marked by the presence of ceramics and locally, has been divided into three Phases, Mesilla, Doña Ana, and El Paso (Lehmer, 1948). The adoption of ceramics played a major role in gradually increasing sedentism and the use of cultigens by providing a secure means of storing cached foodstuffs. In the archaeological record, the sedentary, or perhaps more appropriately, semi sedentary, Formative period adaptation is reflected by villages that frequently include comparably large, communal/socio-religious structures (Whalen, 1994; Wiseman, 2002). The more mobile aspects of Formative period subsistence practices are represented by artifact scatters that predominantly include thermal features and are inferred to reflect foraging and/or logistical subsistence activities.

Mesilla Phase (AD 200-1100). The Mesilla phase (AD 200 to 1100) appears to represent a continuation of the Hueco phase subsistence pattern, with the addition of undecorated brownware ceramics referred to as El Paso Brown (Whalen, 1994). Brush huts and pit structures comprise the documented habitation structure types, and large pit structures suspected to have served communal functions typically occur on more intensively occupied sites. Subsistence evidently remained focused on hunting and gathering, with horticultural activities constituting a secondary resource (Carmichael, 1981, 1985, 1990; Hard, 1983). The most readily detectable changes in ceramic assemblages associated with the late Mesilla phase include a decrease in brownware jar rim taper along with the addition of Mimbres Black-on-white and occasionally, San Francisco Red Ware types.

Doña Ana Phase (AD 1100-1200). The Doña Ana phase began around AD 1100 and continued until about AD 1200. Rectangular pit structures become common during the Doña Ana phase, although Lehmer's (1948) excavations at Los Tules suggest that similar examples may have been present during the late Mesilla phase. Paint decorations become prominent on the local brownware, resulting in assemblages dominated by El Paso Bichrome and El Paso Polychrome. In addition Mimbres Black-on-white ceramic types, Chupadero Black-on-white, Three Rivers Red-on-terracotta, and St. Johns Polychrome are added to the list of intrusive ceramics. The use of cultigens continues to increase during the Doña Ana phase, but groups probably continued to employ several land-use strategies.

El Paso Phase (AD 1200-1450). The El Paso phase (AD 1200 to 1450) represents the culmination of the Formative period in the Jornada culture region and includes evidence for several large aggregated population centers near permanent water sources (Bentley, 1993; Lehmer, 1948; Lekson and Rorex, 1987; Sale and Laumbach, 1989). In the Hueco Bolson and Tularosa Basin, architecture during the El Paso phase is exemplified by linear, contiguous puddled adobe pueblo room blocks. Although a few large plaza-style pueblos have been reported, most of the pueblos include less than 20 rooms (Moore, 1996). El Paso phase adobe field houses, as well as both round and rectangular pit structures are also reported (Browning et al., 1992; Hedrick, 1967; Moore, 1996). Along the western foothills of the San Andres Mountains, however, cobble foundation alignments and upright slab foundations or cimientos have been documented on sites attributed to the El Paso phase (Lekson and Rorex, 1987).

Ceramic assemblages during this phase reflect increasing contacts with the western Mogollon region of southeast Arizona and southwest New Mexico, northwest Chihuahua, east-central Arizona, northwest New Mexico, and the northern frontiers of the Jornada Mogollon area. Ceramic types such as Gila Polychrome, Lincoln Black-on-red, Ramos Polychrome, Playas Red, and Seco Corrugated comprise the dominant intrusive wares. The locally produced El Paso Polychrome develops everted rims and completely replaces undecorated brownware during the El Paso phase. It also begins to appear in contexts well beyond the Jornada culture area. The widespread distribution of El Paso Polychrome, along with the array of intrusive ceramic types, a noted increase in imported shell, and evidence of Mesoamerican influences reflected in rock art, indicate that extraregional interaction increased markedly during the El Paso phase.

The ubiquity of corn, along with mounting evidence of beans and squash identified in El Paso phase habitation sites, indicates that the use of cultigens had reached an all-time high. Although agriculture may have provided an important subsistence resource, wild plants continued to play a major dietary role (Bradley, 1983; Moore, 1996).

1.6 Southern Mogollon Tradition in New Mexico (AD 200–1450)

Mogollon culture was first proposed by Gladwin (1934) and first defined by Haury (1936). This tradition marks the rapid development of agricultural communities in the region, with the most prominent trends involving significant population growth and subsequent rapid decline, a shift from pithouse communities to aboveground pueblos, and the appearance of ceramic technology and the proliferation of decorated pottery types.

Several temporal divisions of the Southern Mogollon tradition have been proposed (e.g., Haury, 1936; Wheat, 1955; Bullard, 1962; and Anyon et al., 1981). According to Gilman (1980), the concept of the Mogollon is useful until about AD 1000, when regional variation has increased. She discusses three temporal divisions:

- Early Pithouse period (AD 200-550);
- Late Pithouse period (AD 550-1000); and
- Classic Mimbres period (AD 1000-1150).

This general framework is used for the current project. Furthermore, Haury (1936) proposed three phases that are divisions of the Late Pithouse period: Georgetown, San Francisco, and Three Circle. Generally, Haury's presentation of culture history has withstood the test of time and has been able to incorporate new data. These phases are also used in the culture history that follows.

Early Pit House Period (AD 200–550). Traditionally, it has been proposed that this period marks the initial appearance of fully permanent villages and full-scale agriculture (e.g. LeBlanc, 1980, 1983, 1989:180). Villages of up to 50 pithouses are known for this period, and are typically situated on elevated, defensible locations adjacent to fertile bottomlands. This suggests a pattern of autonomous, village-level polities with a prevailing threat of inter-polity conflict. Utilization of more xeric areas appears to have sharply diminished in this period. Population estimates for the Mimbres Valley (Blake et al., 1986; LeBlanc, 1989:190) suggest a nearly three-fold demographic increase during this period, from an estimated population of 290 at AD 200 to 830 at AD 550. Pottery appears during this period and consists of undecorated wares classified as Alma Plain Brownware and small amounts of San Francisco Redware.

Late Pit House Period (AD 550–1000). The Late Pit House period is marked by the abandonment of defensive locations on isolated knolls and the establishment of new villages on lower river terraces in the midst of good farmland. There were also changes in ceramics, architecture, and burial practices (LeBlanc, 1977, 1980).

Several phases divide this period, with three successive phases characterizing the period in the vicinity of the project area Georgetown (AD 550-650), San Francisco (AD 650-750), and Three Circle (AD 750-1000).

Georgetown-phase sites are characterized by circular or D-shaped pithouses with a lateral entrance. Pottery includes San Francisco Red, Alma Plain, Alma Neck-banded, and Alma Scored ceramics (LeBlanc, 1980).

The San Francisco phase is characterized by rectangular pithouses with plastered walls, inclined lateral entranceways, and posts in line with the lengthwise axis of the house. Ceremonial houses are also subterranean, but kidney-shaped. Ceramic assemblages include increased frequencies of San Francisco Redware, high frequencies of Alma Plain, and the appearance of the earliest known painted ceramics, including Mogollon Red-on-brown, Three Circle Red-on-white, Mimbres Black-on-white Style I, and San Lorenzo Red-on-brown (LeBlanc, 1980).

The Three Circle phase is named for the Three Circle site at the northern end of the Mimbres Valley and excavated in the 1920s (Bradfield, n.d.). Although pithouses retained a rectangular form, there were changes in ceramics. Pottery assemblages exhibit greater variability than before, with much higher frequencies of Three Circle Black-on-white, San Francisco Redware, Mimbres Black-on-white Style II, Reserve Smudged, and Alma Textured. Mogollon Red-on-white is no longer the dominant pottery type during this phase(LeBlanc, 1980).

Classic Mimbres Period (AD 1000–1150). Three major cultural changes mark this period. First, there was a shift to aboveground, pueblo-style dwellings. This was not entirely a sharp break from the past, as late Three Circle-phase semi-subterranean structures include many examples with cobble walls and three major posts running down the central axis of the room. The shift to aboveground structures in the Classic Mimbres “simply involved the construction of equivalent rooms without placing them in a pit” (LeBlanc, 1989:187). Roomblocks include both habitation and storage rooms, reflecting increasing segregation of functional space. Great kivas were discontinued over the course of this period. Their function may have been taken over by plazas that were loosely defined by surrounding roomblocks.

The second major development is the proliferation of Classic Mimbres painted pottery, which represents the artistic peak of ceramic embellishment for this region, if not the entire Southwest. A brownware, like earlier Mogollon pottery, the style has a white or gray slip. Color on Mimbres pottery was first red on white and later black on white. Leading scholars of

Mimbres ceramics consider the technological and stylistic changes to have developed in-place, rather than being imposed by other groups (Brody, 1977; Cordell, 1997; LeBlanc, 1989).

The third major development relates to continued population growth. Population estimates for the Mimbres Valley suggest an increase from around 3,200 people at AD 1000 to a prehistoric demographic peak of 5,133 at AD 1130. One of the largest villages of this period, Galaz, had a population of roughly 300 persons, which is only slightly higher than the estimated population for the Three Circle-phase component at this site (Anyon and LeBlanc, 1984:187-192). These patterns suggest that population growth was accompanied by community fission and the establishment of many new settlements at this time. Such population levels strained the productivity of available farmland, and depleted other critical resources such as firewood and game. Communities expanded into increasingly marginal areas, whose productive potential was increased by the construction of water-management facilities such as check dams. Fieldhouses were constructed in marginal areas and between major villages in the main river valleys. The formation of larger corporate groups may have facilitated the level of integration necessary for the kinds of regularized communal exchange required for efficient exploitation of diverse localities by a single community.

Black Mountain Phase (AD 1150–1300). Culture history periodization in the region is not clear after the Mimbres phase. As Lekson writes, "Southwestern New Mexico had been the center of Mimbres Mogollon development, but after the Mimbres phase, the area in effect becomes a frontier between archaeological entities defined in adjoining portion of southeastern and west-central New Mexico, northern Chihuahua, and southern Arizona" (Lekson, 1992:86).

From one point of view, the Black Mountain phase followed the collapse of the Classic Mimbres cultural system and is contemporary with the rise and florescence of the large sociopolitical center at Casas Grandes in northern Chihuahua. The regional interaction sphere that developed around Casas Grandes included the Mimbres region. In many ways, the Casas Grandes network paralleled (and may have replaced on a regional scale) the interaction sphere associated with Chaco Canyon, a similar sociopolitical center that was already well into its collapse by the beginning of this period. Casas Grandes far exceeds in scale and complexity all other cultural developments in the prehistory of the Southern Mogollon region. This center probably hosted a population between 2,000 and 3,000 and contains evidence of considerable communal labor in the form of platform mounds, ballcourts, and aqueducts, and was apparently a major center of craft specialization and production. Elite burials are associated with elaborate graves and furnishing, and architectural patterns within the site suggest elite residences as well. Although there is debate surrounding the nature of sociopolitical organization at Casas Grandes, evidence suggests it had been structured as a simultaneous hierarchy, or chiefdom.

Salado (Cliff Phase) (AD 1300–1450). The collapse of the Casas Grandes interaction sphere must have had a profound impact on the Southern Mogollon area. Unfortunately, the archaeological record of developments in the post-Casas Grandes period is far from clear (LeBlanc, 1989:196). What is known about sites of this phase in the Mimbres area suggests close relationships with "Salado" sites in southeastern Arizona. The Salado period is represented in the southwestern New Mexico by what is sometimes called the Cliff phase (LeBlanc and Nelson, 1976; Nelson and LeBlanc, 1986).

Adobe-walled pueblos, usually exhibiting a U- or L-configuration are typical, with an adobe wall closing off the open end of the roomblock and defining a plaza area. There is little or no investment in ceremonial architecture, and architectural patterns suggest not only the continued absence of a sociopolitical elite, but perhaps the disappearance of corporate groups, which were suggested in the Classic Mimbres by the association of a roomblock with a kiva. Also, there is no obvious differentiation between habitation and storage rooms, and rooms within the pueblos show almost no differences between each other. Large settlements containing 100 or more rooms become common in the Southern Mogollon region at this time, although much smaller pueblos and fieldhouses are present as well; however, field houses have not been identified in the archaeological record of the Mimbres Valley.

1.7 Early Agricultural Period In Southeastern and Southcentral Arizona (Formative Stage AD 1-1450)

The Early Agricultural period in southeastern and south-central Arizona provides the basis for the Formative period, traditionally defined by "[t]he presence of agriculture or any other subsistence economy of comparable effectiveness and the successful integration of such an economy into well-established sedentary village life" (Willey and Phillips, 1958:146). Recent research (e.g., Gilman's [1997] work in the San Simon Valley) has shown that the degree of sedentism in Formative populations in the region could be variable. In terms of material culture, the introduction of pottery marks the advent of the Early Formative. Deaver and Ciolek-Torrello (1995) have proposed an Early Formative chronology for the Tucson Basin, based on technological developments in pottery:

Plain Ware Horizon	AD 1-425
Red Ware Horizon	425-650
Early Broadline Horizon	650-700
Snaketown Horizon	700-800

The Plain Ware Horizon "represents the adoption of pottery containers by Late Archaic period populations…in response to increased dependence on maize agriculture and increasing permanence of settlements" (Deaver and Ciolek-Torrello, 1995:513). This horizon is conceived of as a pan-Southwest phenomenon that also "appears to represent the indigenous culture antecedent to those later cultures we recognize as Mogollon, Hohokam, and Anasazi" (Whittlesey et al., 1994:76). Sayles (1945) was able to posit a demonstrable continuum from Cochise culture to the that of the San Simon branch of the Mogollon. Whether Hohokam culture was also an in situ development from the Late Archaic was for years a matter of debate, because of a perceived discontinuity between the San Pedro phase and the initial appearance of Hohokam as a distinctive cultural tradition, a discontinuity that "suggested a unique origin for Formative culture in the Sonoran desert—one based on immigration of technologically advanced populations from Mexico" (Ciolek-Torrello, 1995; see Haury, 1976). The Plain Ware Horizon, identified as the Red Mountain phase in the Phoenix Basin and the Agua Caliente phase in the Tucson Basin, essentially bridges the gap (Cable and Doyel, 1987).

In the San Simon Valley, the San Simon branch was defined by Sayles (1945) as a sequence based on ceramic typology beginning with the Peñasco phase; continuing through the Dos Cabezas, Pinaleño, Galiuro, and Cerros phases and ending with the Encinas phase. The San Simon branch was influenced by surrounding cultural provinces. In the San Simon

Valley, this meant close ties with the Mimbres Mogollon on the east; to the west, in the Sulphur Springs and San Pedro valleys, Hohokam influence was pronounced. Sayles' original sequence has been revised by Franklin (1978) and most recently by Gilman (1997), who has restructured and extended the sequence into five periods:

Early Pit Structure Period	AD 100-650
Middle Pit Structure Period	650-900
Late Pit Structure Period	900-1050
Surface Structure Period	1050-1150
Post-1150 Period	1150-1450

As a result of her investigations in the San Simon Valley, Gilman (1997:84) found that "[d]uring the early Pit Structure period, sites were located where the most reliable water was present, allowing access to the densest wild food and the best farmland. More sites and probably more people were present in the later Pit Structure periods, and sites were additionally located on secondary washes and in areas not previously used for habitation" Gilman (1997:84). To the south, Douglas (1987) has proposed a chronology for the San Simon branch in the San Bernardino Valley consisting of early, intermediate, and late pit house periods dating from 450 to 1150; following sparse occupation of the valley during the early pit house period, survey data suggest an increase in both population and utilization of the valley resources from the end of the intermediate period through the late period. Ceramic assemblages at these sites contain Alma Plain (the common Mogollon plain ware), the San Simon series of painted wares, and Mimbres Black-on-white (Douglas, 1987).

Post-1150 developments in the San Simon Valley are not well known. Gilman (1997) suggests that during the Surface Structure period, as a result of subsistence intensification, populations in the valley began to aggregate in the large settlements along the Gila River in the Safford Valley, with access to permanent water for irrigation; thus, by 1150, "the San Simon seems to have been generally used logistically [i.e., for resource procurement] rather than residentially" (Gilman, 1997:70). In the Safford valley, and in the San Bernardino, Sulphur Springs, and San Pedro valleys, the period from ca. 1150 to 1300 has been associated with Western Pueblo culture. Originally defined by Reed (1948) and modified by Johnson (1965), this complex "developed in the mountainous region of east-central Arizona and west-central New Mexico about AD 1000. It represents a cultural syncretism of Mogollon features, Pueblo traits, and Hohokam elements" (Johnson and Wasley, 1966:249). Key Western Pueblo sites in the area are AZ V:16:8 and 10 (ASM), the Bylas sites, in the Safford Valley (Johnson and Wasley, 1966) and AZ F:3:8 (ASM), the Ringo site, in the Sulphur Springs Valley (Johnson and Wasley, 1966). The period from ca. 1300 to 1450 throughout southern Arizona is associated with the concept of the Salado, discussed below.

Hohokam culture was first defined in the Phoenix Basin, the core area of the culture (Gladwin, 1928; Gladwin and Gladwin, 1934; Gladwin et al., 1937). A Hohokam chronology is given in Table 1. By the mid-Colonial period, the full set of cultural traits had been developed, including public architecture in the form of ballcourts, a large infrastructure of irrigation canals, an extensive trade network with surrounding regions, a mortuary complex based on cremation, and a distinctive material culture of red-on-buff pottery, shell jewelry, and other crafts. The original core-periphery model of the relationship of the Phoenix Basin to the Tucson Basin and other areas (Gladwin and Gladwin 1934; Haury 1976) has been supplanted with the concept of a Hohokam regional system, in which the ballcourts served as nodes for social and economic interaction (Crown 1991; Doyel 1991; Wilcox, 1979; Wilcox and Sternberg, 1983). During the Colonial period, the Tucson Basin became integrated with the regional system, while maintaining distinct differences from the Phoenix Basin. Populations in the Tucson Basin relied on "a more diversified subsistence base with less emphasis on irrigation" (Foster et al., 2002:26). In terms of material culture, Tucson Basin red-on-brown pottery parallels the Phoenix Basin red-on-buff sequence.

TABLE 1
Hohokam Chronology
(Cable and Doyel 1987; Dean 1991; Deaver and Ciolek-Torrello 1995; Wallace and Craig 1988)

	Period	**Phoenix Basin Phases**	**Tucson Basin Phases**
1450			
1400			
1350			
1300		Civano	Tucson
1250			
1200			
1150	Classic	Soho	Tanque Verde
1100			
1050			
1000			
950	Sedentary	Sacaton	Rincon
900			
850		Santa Cruz	Rillito
800			
750	Colonial	Gila Butte	Cañada del Oro
700		Snaketown	Snaketown
650			
600		Sweetwater	
550			
500		Estrella	
450			
400			Tortolita
350			
300		Vahki	
250			
200			
150			

TABLE 1
Hohokam Chronology
(Cable and Doyel 1987; Dean 1991; Deaver and Ciolek-Torrello 1995; Wallace and Craig 1988)

	Period	Phoenix Basin Phases	Tucson Basin Phases
100			
50			
AD 1	Pioneer/Early Formative	Red Mountain	Agua Caliente

The regional system reached its maximum extent during the first half of the Sedentary period. New settlements were established and many existing large villages, such as Snaketown, attained their greatest size and complexity. Evidence suggests that pottery was being mass-produced by specialists (Abbot, 1983). However, the later part of the period saw major changes: the settlement system contracted, populations aggregated along major drainages, and ballcourts were abandoned. By the end of the period, the regional system was collapsing. During the subsequent Classic period, the platform mound replaced the ballcourt as public architecture. Canals in the Phoenix Basin were consolidated, resulting in linear systems of irrigation communities (Doyel, 1980; Howard, 1987), which were "comprised of one or more platform mound villages that served as administrative centers to regulate the allocation of water and organize the construction and maintenance of the canal system" (Waters and Ravesloot, 2001:291). Various reasons, from social to environmental, have been proposed to account for this transformation. Waters and Ravesloot (2001) attribute the changes to a period of channel downcutting and widening on the middle Gila River between 1020 and 1160 that "disrupted nearly a millennium of floodplain stability" (Waters and Ravesloot, 2001:292) and would have required a reconfiguration of the entire canal system. They also note that in the Tucson Basin a similar "dramatic cultural reorganization between 1050 and 1150 is coincident with the cutting of a deep channel into the floodplain of the Santa Cruz River" (Waters and Ravesloot, 2001:295).

Other Classic-period developments included the appearance of adobe architecture and walled compounds, a decline in the production of red-on-buff pottery with a corresponding increase in red ware, and a reorientation of trade and exchange networks. In terms of mortuary customs, cremation had been preferred during the pre-Classic period, although inhumation also occurred during the late pre-Classic. In the Classic period, cremation continued to be practiced, but inhumation became increasingly common. The beginning of the Civano phase in the Phoenix Basin and the Tucson phase in the Tucson Basin, ca. 1300, is associated with the advent what is termed the Salado horizon, defined by the common denominator of Gila Polychrome, the most widely produced and distributed of all ceramic types in the Southwest (Nelson and LeBlanc, 1986; Rice, 1998). The concept of the Salado (the name comes from the Salt River, or Río Salado) was originally developed to explain the changes that occurred during the Classic period; the Salado were presumed to have been a mixed Mogollon-Anasazi population who had migrated into the Tonto Basin, and from there into the Phoenix Basin, "taking with them pueblo traits such as polychrome ceramics, walled compounds, and inhumation burial practices" (Rice, 1998:14).

Subsequently, the concept was broadened to the explain changes perceived in other areas during the Classic period. However, as Nelson and LeBlanc (1986:6) point out, "the concept of Salado has been employed in a most haphazard manner.[T]here is essentially nothing that ties together all of the manifestations that have been labeled Salado, other than the presence of a single pottery type, Gila Polychrome." At the same time, they acknowledge that an inclusive conceptual approach is necessary to understand the "new forms of interaction within and between areas" that appeared in the fourteenth century (Nelson and LeBlanc, 1986:14). As summarized by Rice (1998:15):

The [Salado] horizon reflects a high level of interaction among people in different areas, based possibly in a shared system of beliefs or in similar organizational responses. Given the current archaeological evidence, it is highly unlikely that the horizon resulted from the migration of a group of people across the entire region, and it is not meaningful to talk about the Salado people of the southwestern U.S. Reference to the Salado of a certain area, such as the Tonto Basin, has meaning only if it is taken to refer to the populations that occupied that area during the Salado phase.

Lekson (2000) defines what he calls the Chihuahuan Salado as encompassing that portion of the Chihuahuan desert that covers southeastern Arizona, southern New Mexico, and northwest Chihuahua. Within this larger context, he places the valleys of southeastern Arizona in the "Casa-Casas Corridor" (Lekson, 2000:286) linking Casas Grandes with Hohokam Casa Grande in the middle Gila Valley, in the same fashion that Di Peso (1974) had attempted to link Casas Grandes with Chaco (which proved mistaken when Dean's and Ravesloot's [1993] revised dates indicated that the rise of Casas Grandes postdated Chaco's collapse). The Casa-Casas Corridor revives a concept suggested previously by Wilcox and Sternberg (1983:255):

The Salado phenomenon that crystallized about 1300 is interpreted as the wide-spread adoption of a new ideology that temporarily facilitated the economic articulation of a series of small-scale regional systems from the Phoenix Basin Hohokam on the west to Casas Grandes on the southeast.

The ideology is still being explored; Crown (1994) has emphasized this aspect of the Salado phenomenon, regarding Gila Polychrome as the manifestation of a program of cultic significance. This program or ideology, however defined, appears to have come to an end in the mid-fifteenth century, when throughout southern Arizona the archaeological record itself comes to an end, indicating a massive region-wide depopulation. Recent research by the Center for Desert Archaeology (CDA) suggests that populations did not abandon the region en masse at 1450. Demographic decline was considerably more complex and involved many of the processes associated with coalescence, including migration and aggregation. After more than a century of gradual decline, the final abandonment of the valley circa 1450 was by a population comprised of descendants of both local and migrant groups [CDA 2004:15]

1.8 Protohistoric Period (AD 1450–1659) New Mexico and Texas

The Protohistoric period begins with the pueblo demise and ends with Spanish colonization of the region. The local area was inhabited by aboriginal people during this time, but because these groups were largely hunter-gatherers, archaeological evidence of their activities remains largely obscure. Because it has limited pertinence to the sites discussed in this report, the Protohistoric period will be introduced in a cursory manner, and the interested reader is referred to Baugh and Sechrist (2001).

Several cultural groups may have been present in the study area when Spanish expeditions first passed through the project area. The Spanish explorers reported groups identified as Suma, Manso, Jumano, and Apache. Chinarra, Concho, Jano, Jocome, Piro, and Tarahumara may also have also occasionally occupied the area (Beckett and Corbett, 1992). A great deal of confusion surrounds the names of groups encountered by the Spanish, but it is generally agreed that the Manso occupied the area around El Paso. The Manso may have been direct descendents of the prehistoric inhabitants of the area, without the trappings of pueblo society (Lukowski and Stuart, 1996). They lived along the Rio Grande in grass or brush huts and relied heavily on fish for sustenance, but limited horticulture may also have been practiced (Camilli et al., 1988). The Manso welcomed the Spanish and eventually, most were persuaded to occupy missions near El Paso. The Pueblo Revolt of 1680 brought native refugee groups from the northern pueblos into the local missions, and the Manso disappeared as a cultural group after a few generations of intermarriage (Beckett and Corbett, 1992).

Among the Protohistoric period groups observed in the area by early explorers and missionaries, the Mescalero Apache were the only documented inhabitants who succeeded in resisting Spanish subjugation. Ethnographic and archival data suggest the Athapaskan ancestors of the present-day Mescalero Apache arrived in the local area during the 1500s (Schroeder, 1973).

Early Spanish records describe bison-hunting native peoples in 1540 (Schroeder, 1973). The Chamuscado-Rodriguez (1581) and Espejo (1583) expeditions reported an unnamed group of nomads, probably Apache, in or near the San Andres or Oscuro mountains west of the Tularosa Basin. By the 1630s, the southern groups in the Jornada region were referred to as *Apaches de Perillo* (Schroeder, 1973: 127). The local Apache were nomadic hunters and gatherers whose territory ranged from southern New Mexico and west Texas, south into Mexico. After the mid-1700s, the Spaniards referred to this group as the *Mescalero* (people of the mescal) because they gathered and roasted the crowns of agave (mescal). In addition to hunting and gathering, the Apache relied on raiding and trade with the pueblos as supplementary means of subsistence. Travelers along El Camino Real de Tierra Adentro (the Camino Real) and residents of the Spanish villages along the Rio Grande were frequent targets. As a result, Spanish expeditions and the establishment of missions around El Paso were confined to areas along the Rio Grande. Due to Apache activity there, the Tularosa Basin and Hueco Bolson receive little mention in Spanish records. For almost 200 years, "from 1610 to 1821, in spite of the Spanish presence, the white sands country remained an Apache domain" (Schneider-Hector, 1993: 32).

1.9 Protohistoric Period (AD 1450-1700) Southern Arizona

The so-called Protohistoric period in southern Arizona has been defined in various ways (Gilpin and Phillips, 1998). The time frame most commonly used is from ca. 1450 to 1700. As Ravesloot and Whittlesey (1987) point out, this is not what "protohistoric" means: "By definition, it must postdate the arrival of Europeans in the New World [and] must also end at the time of continuous occupation by or continuous contact with Europeans….Thus, the end date of the Protohistoric is fluid and will not be the same in all areas" (Ravesloot and

Whittlesey, 1987:83). For southern Arizona, they prefer to define the period as beginning with the first formal Spanish entrada–Coronado's expedition of 1540-1542–and ending with the establishment of the presidio at Tubac in 1752. The fact remains that discussions of this transitional period generally begin at the end of the seventeenth century, when the Jesuit Order undertook the conversion of the northern reaches of Pimería Alta (Land of the Upper Pima), as this portion of New Spain was called.

The inhabitants of this territory were the O'odham; their language, Piman, is one of the Sonoran languages within the Uto-Aztecan family (Miller, 1983). The O'odham consisted of the Sobaipuri, living on the middle Santa Cruz and San Pedro; the Tohono O'odham, west of the Santa Cruz; the Hia C'ed O'odham, farther to the west; the Kohatk, on the lower Santa Cruz, and the Akimel O'odham, along the middle Gila (Erickson, 1994). The Sobaipuri, the Kohatk, and the Akimel O'odham were known as One Villagers, living in ranchería-type settlements along the rivers and relying on agriculture for a significant portion of their subsistence; the Sobaipuri at Bac were irrigating with canals when the Spanish arrived (Fontana, 1983). The Tohono O'odham were known as Two Villagers, moving seasonally between their winter well villages in the foothills and summer field villages in the valleys, where they practiced alluvial fan floodwater farming (Foster et al., 2002). The Hia C'ed O'odham, mobile hunters and gatherers, were known as No Villagers (Erickson, 1994).

East and northeast of O'odham lands was the territory of Athapaskan groups that had entered the Southwest from the north sometime in the sixteenth century. Southeastern Arizona is considered the homeland of the Central band of the Chiricahua Apache; to the north were the Western Apache (Basso, 1983; Opler, 1983). These groups utilized different environmental zones by employing hunting and gathering strategies that allowed them to exploit large areas containing varied resources (Lekson, 1985). The mobility of the Apache tribes was also instrumental in allowing them to effectively control much of their range throughout the Spanish Viceregal and Mexican Republic periods and well into the U.S. Territorial period. The Apache regarded all settlements(O'odham, Spanish, Mexican, or Anglo)as resources to be exploited by periodic raiding (Basso, 1983).

1.10 Historic Period (AD 1659–present) Texas and New Mexico

In late 1597, Juan de Oñate led soldiers and colonists north from Mexico. In April they reached the San Elizario area at the eastern end of the El Paso Valley. The expedition rested there for a week, caught many fish, and hunted ducks and geese. By the end of the month, Oñate claimed for Spain the entire region drained by the Rio Grande.

After the colonization and partial Christianization of the El Paso/Juárez area, Spanish caravans used the Camino Real (the "royal road" linking Mexico City with northern New Mexico) to transport needed supplies to Spanish settlements in New Mexico. In 1659, the Christianized Indians built an adobe church for the mission of Nuestra Señora del Guadalupe de Los Mansos del Paso del Norte. By 1662, a larger and more permanent church with the same name was dedicated and is still in use in Juárez, Chihuahua, Mexico (Lockhart, 1995). The community that developed around the mission became known as El Paso del Norte and would later be changed to Ciudad Juárez (Simmons, 1991; Sonnichsen, 1968; Timmons, 1990). By 1680, El Paso del Norte, or Ciudad Juárez, included many acres of cultivated land, 13,000 sheep and goats, and 9,000 head of cattle (Sonnichsen, 1968).

As Spanish rule became more demanding of the Indian population, resentment and mistrust of all that was Spanish increased. Tensions mounted and on August 10, 1680, the northern Pueblo Indians revolted against the Spaniards. The Spaniards headed south towards El Paso del Norte. Upon their arrival in the El Paso area, Spanish Governor Otermín determined that maintaining a base of operations in Paso del Norte was favorable for the reconquest of the Pueblo Indians and prevention of further uprisings.

In February of 1682, Otermín founded three pueblos for the Piro and Tiwa, who had fled with the Spanish during the Pueblo Revolt (Hughes, 1914). These pueblos were Senecú, Socorro, and Isleta del Sur. By 1684, severe drought had greatly affected both Spanish and Indian communities and the Indian community revolted, but by 1685, Spanish control over Paso del Norte was regained (Forbes, 1960; Hughes, 1914). Control over the New Mexico territory was not regained until 1692 (Timmons, 1990: 22).

In New Mexico, silver and copper was discovered. Copper was found in the Santa Rita area of southwestern New Mexico in the 1770s, when the Sierra de Cobre were named, although Native Americans no doubt knew of the deposits before. Spanish miners used convict labor to extract ore, which was shipped to Ciudad Chihuahua along the "Copper Trail' along Santa Rita Creek to the present location of Fort Bayard. The mine operated from the 1790s to about 1820, but subsequent mining operations have obliterated remains of early mining activity (Pratt and Scurlock, 1991). Descriptions of Spanish mining methods are found in Bartlett (1856), in his 1851 report on landscapes along the boundary.

By 1700, population levels among the Spanish and Indian communities had decreased. Entire settlements were abandoned, and by the mid-1700s, Apache raids increased in the Paso del Norte area (Adams and Chavez, 1956). The Spaniards increased the number of soldiers, and the first San Elceario presidio was established from 1774 to 1780 (Porter, 1973: 41). It was located across the Rio Grande from Fort Hancock (Peterson and Brown, 1994: 90). The struggling communities persevered, and by the nineteenth century, population and trade had increased (Baxter, 1987; Thornton, 1987; Timmons, 1990). The second Presidio de San Elceario was later renamed San Elizario and relocated to its present site in 1789 (Porter, 1973: 29, 40).

Mexico declared its independence from Spain in 1821, but very little changed with regard to governmental, legal, and social systems—Spanish influence prevailed. This proved to have both positive and negative consequences, not only for the Paso del Norte region, but also for all of Mexico and its territories.

In 1836, Texas claimed its independence from Mexico but did not include Paso del Norte or New Mexico until the Texan invasion of New Mexico in 1841. Texas claimed all territory north of the Rio Grande, including its mouth and headwaters. Mexico refused to accept the proposed boundary.

By 1846, the Polk administration was determined to expand American territory, and in May of that year, the United States declared war against Mexico. The United States claimed the Rio Grande as its border, but Mexico claimed the Pecos River as the official border. In December of 1846, the United States military invaded Mexican territory by entering El Paso Del Norte, or Juárez, Chihuahua, Mexico (Timmons, 1990).

After the defeat of Mexico in 1848, both governments signed the controversial Treaty of Guadalupe Hidalgo. The treaty stated that Mexico would retain everything south of the Rio Grande (Meyer and Sherman, 1995). With the Gadsden Purchase of 1853, the United States acquired the Mesilla Valley (today southern New Mexico and Arizona) and further established the present boundary as the official U.S.-Mexico International Border.

The El Paso, Texas, area began as a mining district in 1847. Silver and copper mines in the Organ Mountains brought in miners, and prospectors used the community as a base station. In southwestern New Mexico, mining became a major industry. Among the silver mining locations were along the Mimbres River, in the Pyramid Mountains, Hillsborough, and the Peloncillo Mountains. Copper was mined at the Santa Rita and Hanover mines. Gold was found and mined at Pinos Altos, the Mogollon Mountains, and the Black Range. Turquoise and copper came from the Burro Mountains (Pratt and Scurlock, 1991). In the Organ Mountains, in 1849, Hugh Stevenson discovered silver. This mine was worked for a about a decade and was sold to Army officers from Fort Fillmore in 1858.

Mail service from established cities such as San Antonio and Santa Fe via El Paso began in 1851 and further pushed the development towards becoming a permanent community. By 1858, mail service from San Antonio to San Diego (now the Butterfield Overland Mail) by way of El Paso further increased the need for an established community. Surveyors platted a new townsite and named it El Paso as more and more U.S. citizens settled the area. By 1860, the newly recognized El Paso, Texas, boasted 428 residents. Across the border in El Paso del Norte, Chihuahua, residents numbered well over 4,000 (Metz, 1988).

Small trading posts, some that grew up to be established towns were found at various locations along the route. One of these locations that are located near this project's right of way is Doubtful Canyon. Doubtful Canyon served as a trading post until the Butterfield Stage ceased business. When the Butterfield Stage was abandoned so was the trading post, until the area was re-established as the town of Steins when the Southern Pacific Railroad was constructed through the canyon in1877.

Before the Civil War, the most likely transcontinental railroad route appeared to be a southern one. Indeed, the acquisition of the Gadsden Purchase was primarily for potential railroad construction. With the victory of the Union in the Civil War, a northern transcontinental route was favored, and the route crossing western Texas had to wait (Leonard, 1981; Reed, 1941). Two railroads were involved in the construction of a rail lines in the southern Southwest. The Southern Pacific and the Texas Pacific were the primary players in an east-west route.

By 1870, the Southern Pacific was consolidated with other lines established by the Central Pacific, basically to protect a transportation monopoly to California. Building eastward from Los Angeles, the Southern Pacific began service in Arizona in 1877 (Walter and Bufkin, 1986). Construction reached Lordsburg on October 18, 1880, and Deming on December 15, 1880.

Meanwhile, the Atchison, Topeka and Santa Fe Railway (ATSF), which had reached the middle Rio Grande Valley in 1880 from Colorado via Raton Pass, built a line south. Nicknamed the Horny Toad Line, this route reached Rincon in 1881. From here tracks were laid to the Black Range and on to Deming (Wilson et al., 1989).

In Deming, the Southern Pacific met the tracks of the ATSF, which were laid by early March of 1881 (Myrick, 1970). Once the Southern Pacific rails were joined with those of the Santa Fe, the nation's second transcontinental rail line had been completed. The route that the Southern Pacific followed provided the easiest crossing of the continental divide; indeed, the advantages of this route were the justification for the Gadsden Purchase, which included this land.

Work continued on the tracks to Texas, and the first train reached El Paso on May 19, 1881. Despite having no authority to build a railroad in Texas, Huntington and his associates did just that. Doing business as the Galveston, Harrisburg and San Antonio Railway, the Southern Pacific interests laid track further east. Meanwhile, another railroad was pushing west towards El Paso.

Railroad stations were basically designated location along the lines to serve the handling of passengers, freight, and other commodities. While the larger towns also had water tanks, switching yards, depots, possibly even turntables, the smaller stations consisted basically of a simple earthen ramp to aid in loading the train cars. In Doña Ana County such a station was established near this project's right of way at Doña. Within Luna County, small stations were established at (east to west) Myndus, Carne, Luxor, Gage, Tunis, Mongola, and Quincy. Within Grant County, small stations were established at Ladim, Separ, and Hawkings, while in Hidalgo County they were established at Lisbon and Ulmarius. All of these stations were established during the initial construction of the Southern Pacific Railroad line. The station at Separ was initially a construction camp for the railroad and is located where the eastern portion and western portion of the Southern Pacific Railroad linked up (Pearce, 1965).

Along the rails, several of larger stations were established in order to directly support the railroad rolling stock and to serve the public. These stations usually consisted of a depot, a siding to switch the trains on and off the main rail, water tanks, sand towers, and other support structures. Depots, used to accommodate passengers and store freight, and ranged from simple wooden lean-tos to elaborately constructed stone structures. Quite commonly around these larger stations and support structures grew small towns. These towns were established to reap the benefits of close transportation for both passengers and commodities. Quite often these were company towns used to house the railroad workers. Within the vicinity of the project right of way there are three towns that were established as these larger stations, two still in existence.

The town of Cambray was founded in eastern Luna County along the rail line as a station with a water tower, when a well was drilled there in 1893 (Pearce, 1965). The area was abandoned by the railroad in 1953, when more efficient water-using engines were introduced, eliminating the need for the number of water stops.

The City of Deming, which serves as the County Seat of Luna County was established in1880. The area grew due to the abundance of irrigated agriculture in the area. Deming was a major station along both the Southern Pacific and the AT&SF lines (Pearce, 1965) and continues to be so in the modern era.

The City of Lordburg, which serves as the County Seat of Hidalgo County was established in 1880, when the small mining town of Shakespeare was missed by the railroad. In order to maintain the living town, a portion of the town of Shakespeare was moved to the tracks and became known as Lordsburg (Pearce, 1965). Lordsburg continues to be a major station for the Southern Pacific Railroad.

Steins was established in 1880 as a station for the Southern Pacific Railroad. This is the same area that was known as Doubtful Canyon when it was used as a Butterfield Stage Station in the 1860s. The town is named for Captain Enoch Steen of the United States Calvary, who was killed by Apaches. Mining in the area of the town consisted primarily of gravel to create the roadbed for the railroad. The town was abandoned in 1945 (Pearce, 1965).

Shakespeare was originally established on the alternate route of the Butterfield Stage. The national Mail and Transportation Company established a stage stop here, calling the town Grant (Pearce, 1965). The town was renamed Ralston after a mining investor, when gold was discovered in the nearby Pyramid Mountains (Jenkins and Schroeder 1974). Finally the name of the town was changed to Shakespeare. The town was bypassed by the railroad. The post office was closed in 1885 (Pearce, 1965).

Valedon, which is located immediately to the west of Shakespeare, had its beginning in 1885 with the discovery of gold, silver and copper ores. The property in time passed through the hands of several owners and in 1913 the Eighty-Five Mining Company acquired the property, sank a shaft and the town began to grow. By 1926, the town had a population of two thousand residents, a theater, several boardinghouses, various stores and a two-room school. Phelps Dodge Company bought the property in 1931 and a year later discontinued operations (Pearce, 1965).

Cattle ranching in the Southwest was an expansion of the Anglo-Texan ranching system. This system of practices developed on the coastal prairies of southwestern Louisiana from influences deriving from the Carolinas and from Tamaulipas, Mexico. Its main features included allowing cattle to feed themselves year-round in stationary pastures on a free range, without additional feeding or protection. With sufficient grass, it is not necessary to fatten cattle for market (Wilson et al., 1989).

Several factors favored the development of the cattle industry in the late nineteenth century:

- The invention of deep well drilling equipment gave ranchers access to water.
- Railroads provided access from remote areas to markets.
- Production of barbed wire (c. 1873) allowed vast areas to be fenced.
- There was also an influx of new capital from foreign and domestic sources to finance ranching (Wilson et al., 1989).

1.11 Historic Period (AD 1700–present) Southern Arizona

In 1701, the first missions in what is now Arizona were established on the Santa Cruz at the Sobaipuri settlements of Bac and Guevavi (Officer, 1987). Over the following decades the area was incorporated into a system of cabaceras (head missions) and dependent visitas, similar to that established by the Franciscans in New Mexico. Following the expulsion of the Jesuits in 1767 by the Spanish Crown, the Franciscans assumed responsibility for the mission program in Pimería Alta. By the 1760s, the military cordón, or line of presidios, defending northern New Spain included garrisons at Tubac on the Santa Cruz and at Terrenate, at the headwaters of the San Pedro. In 1775, in order to provide more effective protection against Apache raids, the cordón was realigned and the presidial garrisons of Tubac, Terrenate, and Fronteras were moved to new sites located farther north: San Agustín del Tucsón (within the present city of Tucson), Santa Cruz de Terrenate (on the San Pedro south of the present town of Benson), and San Bernardino (in the San Bernardino Valley south of the present border) (Officer, 1987). Up to 1776, southern Arizona constituted part of the province of Sonora, within the Viceroyalty of New Spain; after jurisdictional reorganization in that year, Sonora was included in a separate administrative unit of frontier provinces.

By the 1770s, the San Pedro Sobaipuri, who had formed a first line of defense against Apache attacks, had abandoned their settlements. Some joined the Akimel O'odham, but most moved to Bac, where they were eventually absorbed into the increasing Tohono O'odham population (Fontana, 1983). For the Akimel O'odham, "the acquisition of wheat from the Spaniards was the most significant development" during this period (Ezell, 1955:173). Two crops, one of wheat and one maize, could be grown each year; by the 1770s, wheat was being grown at all the villages along the middle Gila (Sheridan, 1988). Around this time, the Akimel O'odham were joined on the middle Gila by the Pee Posh, an "amalgam of Yuman subgroups" who had migrated from the lower Gila River and lower Colorado River area (Harwell and Kelly, 1983).

In 1787, Spanish authorities instituted a policy of offering inducements (primarily, rations of beef, corn, sugar, and tobacco) for Apache bands to sue for peace. The strategy proved relatively successful and was continued in the early years of the Mexican Republic, after the achievement of independence in 1821. During this time when the frontier was free from the constant threat of Apache raids, a number of land grants were applied for and approved.. Those in southeastern Arizona consisted of San Juán de las Boquillas and San Rafael del Valle, on the San Pedro, and San Bernardino, the headquarters of which was located at the former presidio (Gerald, 1968; Wagoner, 1975). All of these grants were large cattle ranching operations (Officer, 1987).

The Apache resumed raiding in the late 1820s, but such incidents were sporadic until 1831, when the insolvency of the government in Mexico City forced it to curtail the Apache rationing program (Officer, 1987; Sheridan, 1995). From 1831, the Hispanic frontier was the scene of constant conflict with the Apache, who were now obtaining arms from Anglo-American traders (paid for with stolen Mexican livestock) (Officer, 1987). Settlements along the Santa Cruz survived, but to the east the fortified ranchos of the San Bernardino grant and those along the San Pedro had to be abandoned. Major Apache routes for raids into Sonora and Chihuahua ran through the San Simon, San Bernardino, and San Pedro valleys (Stevens, 1963).

In 1846 the United States invaded Mexico; two years later, Mexico was forced to cede much of its land to the United States by the Treaty of Guadalupe Hidalgo. Most of southern Arizona below the Gila River remained Mexican territory until the United States acquired this territory by the Treaty of La Mesilla, ratified in 1854. Southern Arizona became part of Doña Ana County, New Mexico Territory. In 1857, the region was linked to the rest of the country by the San Antonio and San Diego Mail Line; the route was taken over the following year by the Butterfield Overland Mail. The route passed through Akimel O'odham and Pee Posh lands, with stage stops at Sacaton, Casa Blanca, and Maricopa Wells, where the Akimel O'odham supplied the stage company with surplus wheat (Ormsby, 1955; Sheridan 1988).

At the outbreak of the Civil War in 1861, federal troops were evacuated from the few posts that had been established in southern Arizona, leaving the region unprotected from Apache raids and Confederate invasion. The following year, the California Volunteers reestablished the U.S. presence and in 1863, the Territory of Arizona was created. These years are considered the beginning of the Anglo period in southern Arizona. As Ayres (1984) has pointed out in reference to the Tucson Basin, this is a political designation that does not reflect ethnic reality; the Hispanic population was the majority in much of the region until the early twentieth century.

Early Territorial Tucson was a bilingual, integrated community and was the primary regional distribution center serving the mining and ranching industries. Freight and stage companies were major businesses (Sheridan, 1986; Walker, 1973). The Butterfield Overland Mail route, which had been discontinued in 1861, was taken over by other companies. By the 1870s, places like Maricopa Wells serviced wagon trains and at least two stages on a daily basis. This frontier economy and society came to an end with the arrival of the Southern Pacific Railroad, which reached Tucson in 1880 and continued east to form a transatlantic link by connecting with the Atchison, Topeka and Santa Fe Railroad (Myrick, 1975). The railroad transformed the region economically, providing miners and ranchers access to markets and bringing in a flood of consumer goods. Socially, it also initiated the wholesale transplantation of Anglo culture.

With increasing demand for land and water, the O'odham were at a distinct disadvantage. By the late 1860s, the Akimel O'odham were "selling or trading several million pounds of wheat a year [and] Piman wheat fields served as the breadbasket of the newly created Arizona territory" (Sheridan, 1988:159). The federal government had established the initial Gila River Indian Reservation in 1859, but failed to recognize their water rights. By 1870, Anglo farmers upstream were diverting the waters of the Gila River. The situation was exacerbated by channel downcutting and widening (Waters and Ravesloot, 2001:293). In a short time, the Akimel O'odham had lost most of their water and their livelihood; the next forty years would be known as the "years of famine" (Ezell, 1983:158-159). Some of the Akimel O'odham and Pee Posh moved to the Salt River, where the Salt River Indian Reservation was established in 1879.

The federal government increased the Gila River Indian Reservation in 1882 and 1883 to most of its present extent, but continued to take no action to protect water rights. In 1887, the dam constructed across the Gila River at Florence cut off all water downstream (Sheridan, 1995). With their subsistence base lost, the Akimel O'odham hired out as field hands in Anglo cotton fields; another source of income was firewood, which resulted in cutting the extensive mesquite bosques along the river. Conditions improved after the first decade of the twentieth century, but federal undertakings like the San Carlos Project had mixed results (Sheridan, 1995). Following the Indian Reorganization Act of 1934, the Akimel O'odham and Pee Posh formally established the GRIC in 1939. The vision of the Pima-Maricopa Irrigation Project now in progress is to restore the livelihood that was lost in the 1870s.

The Tohono O'odham also worked in the Anglo cotton fields. Their claim to a portion of the Tucson Basin was recognized in 1874 by the creation of the San Xavier Reservation, although this represented only a fraction of their homeland. The Sells Reservation was established in 1916, but much of this was revoked the following year at the insistence of Anglo ranchers. The reservation did not achieve its present extent until 1937, when the Tohono O'odham Nation (TON) was constituted. The Ak-Chin Community, between the GRIC and the TON, consists of Tohono O'odham. This Community, which is a separate entity from the TON, was established as the Maricopa Reservation in 1912. In 1962, the Ak-Chin Community Farms Enterprise was established and in 1988 the Community won a protracted battle with the federal government over water rights.

In southeastern Arizona Territory, the Chiricahua Apache fought a losing battle against the U.S. Army that ended with their surrender in 1886, after which they were exiled to Florida (Opler, 1983). As the hostilities drew to a close, ranchers and later farmers began moving into the area. Cochise County was formed from the eastern portion of Pima County in 1881. The 1880s were boom years for the cattle industry, one of the largest outfits being the San Simon Cattle Company in the San Simon Valley. As noted previously, the 1890s witnessed the results of overstocking combined with a major drought; as Sheridan (1995:141) notes, "[i]t was a disaster of biblical proportions, one in which nature and greed conspired to magnify their individual effects. Cattle died like flies all over the territory, but the losses were greatest in southern Arizona, where 50 to 75 percent of all animals perished." Cattle ranching recovered, but on a considerably reduced scale. In the 1920s, farmers began settling in the San Simon Valley, taking advantage of its artesian wells. At the same time, agricultural development began in the Santa Cruz Flats. Besides O'odham, the cotton farmers there relied on Mexicans and, in the 1930s, Anglos fleeing the dustbowl.

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APPENDIX I.

Legal Descriptions of ROW Land

KINDER MORGAN EAST LINE EXPANSION PROJECT THROUGH THE DEPARTMENT OF THE ARMY FORT BLISS MILITARY RESERVATION LANDS

SFPP ORIGINALDEPARTMENT OF THE ARMY PERMITS:
DA-29-005-ENG-1638 & DA-29-005-ENG-4796

STATE OF TEXAS

EL PASO COUNTY, TEXAS

Township 1 South, Block 80, Texas and Pacific Railway Survey
Section 27: W½SW¼
Section 28: E½NE¼, NE¼SE¼
Section 34: W½NW¼, SE¼ NW¼, N½SW¼, SE¼SW¼
Section 39: SW¼NE¼, E½NW¼, W½SW¼
Section 46: N½NE¼, SE¼ NE¼, E½SE¼
Section 47: SW¼SW¼

Township 2 South, Block 80, Texas and Pacific Railway Survey
Section 2: W½W½
Section 11: W½NW¼, NW¼SW¼

SFPP EAST LINE EXPANSION PROJECT BLM LANDS IN NEW MEXICO AND ARIZONA AND THE GILA RIVER INDIAN RESERVATION IN ARIZONA

STATE OF NEW MEXICO

SFPP BLM PERMIT: NMNM-0-018856

Dona Ana County, New Mexico

Township 25 South, Range 1 East, New Mexico Principle Meridian
Section 19: SW¼NE¼, NW¼
Section 20: NE¼SW¼, N½SE¼
Section 21: N½SW¼, SE¼SW¼, S½SE ¼

Township 25 South, Range 1 West, New Mexico Principle Meridian
Section 7: N½SW¼, S½SE¼, NW¼SE¼
Section 8: S½SW¼
Section 14: S½S½, NW¼ SW¼
Section 15: SW¼NW¼, N½S½, SE¼SE¼
Section 17: N½NE¼, NE¼NW¼
Section 23: NE¼NE¼
Section 24: N½N½

Township 24 South, Range 2 West, New Mexico Principle Meridian
Section 31: S½SW¼

Township 25 South, Range 2 West, New Mexico Principle Meridian
Section 3: S½S½
Section 4: SW¼NW¼, N½S½, SE¼SE¼
Section 5: S½NE¼, NW¼
Section 6: N½N½
Section 10: NE¼NE¼
Section 11: N½N½, SE¼NE¼
Section 12: N½SE¼, SW¼NE¼, S½NW¼

Township 24 South, Range 3 West, New Mexico Principle Meridian
Section 28: S½SW¼
Section 29: S½SE¼, N½SW¼, SE¼SW¼
Section 30: S½NE¼, S½NW¼
Section 33: N½NE¼, NE¼NW¼
Section 34: N½
Section 35: W½, N½SE¼

Township 24 South, Range 4 West, New Mexico Principle Meridian
Section 22: S½NW¼, NW¼SE¼, SW¼NE¼
Section 24: SW¼SW¼
Section 25: N½NE¼

Luna County, New Mexico

Township 24 South, Range 5 West, New Mexico Principle Meridian
Section 9: S½NW¼, NE¼SW¼, N½SE¼
Section 10: SW¼, SW¼SE¼
Section 13: NE¼SE¼
Section 14: E½NE¼

Township 23 South, Range 6 West, New Mexico Principle Meridian
Section 31:NE¼NW¼, N½NE¼

Township 23 South, Range 7 West, New Mexico Principle Meridian
Section 19: Lots 10, 11, 12, 13, S½S½NE¼
Section 22: SW¼SW¼
Section 26: S½NW¼
Section 27: N½N½

Township 24 South, Range 12 West, New Mexico Principle Meridian
Section 11: S½NW¼, N½NE¼
Section 12: NW¼

Township 24 South, Range 13 West, New Mexico Principle Meridian
Section 14: NE1/4NW1/4, SW¼NW¼, NW¼NE¼
Section 15: S½N½, NW¼SW¼

Grant County, New Mexico

Township 24 South, Range 14 West, New Mexico Principle Meridian
Section 22: N½SE¼, NE¼SW¼
Section 23: S½N½, N½S½
Section 29: NW¼, W½NE¼
Section 30: S½N½, N½S½

Township 24 South, Range 15 West, New Mexico Principle Meridian
Section 25: SW¼
Section 26: S½S½
Section 27: SE¼SE¼
Section 28: SW¼NW¼

Township 24 South, Range 16 West, New Mexico Principle Meridian
Section 4: S½SE¼, NE¼ SW¼
Section 10: NE¼SE¼
Section 11: SW¼, SW¼SE¼
Section 14: NE¼, NE¼NW¼

Hidalgo County, New Mexico

Township 23 South, Range 18 West, New Mexico Principle Meridian
Section 3: SW¼SE¼
Section 6: N½NW¼, S½NE¼

Township 23 South, Range 19 West, New Mexico Principle Meridian
Section 35: SE¼SE¼

Township 23 South, Range 19 West, New Mexico Principle Meridian
Section 1: N½N½

SFPP BLM PERMIT: NMNM-0-554582

Section 3: NE¼SE¼, S½SE¼
Section 8: SE¼SE¼
Section 9: SE¼NE¼, N½S½, S½SW¼
Section 10: NW¼NE¼, N½NW¼, SW¼NW¼
Section 17: NE¼, S½NW¼, NW¼SW¼
Section 18: SE¼SW¼, E½SE¼, SW¼SE¼

Township 23 South, Range 20 West, New Mexico Principle Meridian
Section 23: SE¼SE¼
Section 24: W½SW¼
Section 26: N½
Section 27: S½SE¼
Section 33: SE¼NE¼, E½SW¼, SW¼SW¼, N½SE¼, SW¼SE¼
Section 34: N½NW¼, SW¼NW¼

Township 24 South, Range 20 West, New Mexico Principle Meridian
Section 5: NE¼, N½SW¼, SW¼SW¼, SE¼NW¼, NW¼SE¼,
Section 6: SE¼SE¼
Section 7: N½NE¼, SW¼NW¼ (Lot 2), NW¼SW¼ (Lot 3), NE¼NW¼

Township 24 South, Range 21 West, New Mexico Principle Meridian
Section 11: S½SE¼
Section 12: S½SW¼, S½SE¼, NE¼SE¼
Section 14: N½NE¼, NE¼NW¼

SFPP BLM PERMIT: NMNM-0-018856 - CONTINUED

Section 15: N½NE¼, NW¼
Section 17: N½N½, SW¼NW¼
Section 18: S½N½

STATE OF ARIZONA

COCHISE COUNTY, ARIZONA

SFPP BLM PERMIT: ARIZONA 033942

Township 14 South, Range 31 East, Gila and Salt River Base and Meridian
Section 13: SE¼SE¼
Section 19: SE¼
Section 21: NE¼
Section 22: NW¼

SFPP BLM PERMIT: AR 08806 R/W

Township 14 South, Range 31 East, Gila and Salt River Base and Meridian
Section 13: NE¼SE¼, SW¼SE¼ (acquired lands)

<u>Township 14 South, Range 32 East, Gila and Salt River Base and Meridian</u>
Section 14: Lots 5, 6, 7 & 8
Section 15: NE¼
Section 16: S½N½
Section 17: S½N½, NW¼SW¼
Section 18: SE¼NE¼, N½SE¼, NE¼SW¼, Lot 3 (NW¼SW¼)

<u>PINAL COUNTY, ARIZONA</u>

GILA RIVER INDIAN RESERVATION

BIA LANDS

<u>Township 4 South, Range 3 East, Gila and Salt River Base and Meridian</u>
Section 4: W½W½
Section 5: NE¼NE¼
Section 9: E½SW¼, SE¼NW¼ and W½NW¼

<u>Township 3 South, Range 3 East, Gila and Salt River Base and Meridian</u>
Section 6: E½SW¼, SW¼NW¼, SW¼SE¼ and W½NW¼
Section 7: E½SE¼, SE¼NE¼ and W½NE¼
Section 8: SW¼SW¼
Section 17: W½SE¼, E½W½ and NW¼NW¼
Section 20: W½E½
Section 29: SE¼SE¼ and W½E½
Section 32: E½E½

<u>Township 2 South, Range 3 East, Gila and Salt River Base and Meridian</u>
Section 31: SW¼SW¼

<u>Township 2 South, Range 2 East, Gila and Salt River Base and Meridian</u>
Section 3: W½W½, SE¼SW¼
Section 4: E½NE¼
Section 10: W½SE¼, SE¼SE¼, E½NW¼ and SW¼NE¼
Section 14: W½W½, SE¼SW¼
Section 15: NE¼NE¼
Section 23: E½SE¼, NW¼SE¼, W½NE¼ and NE¼NW¼
Section 25: E½SW¼, SW¼SE¼, W½NW¼
Section 26: NE¼NE¼
Section 36: E½SE¼, SE¼NE¼, W½NE¼, NE¼NW¼ and NW¼SE¼

Township 1 South, Range 2 East, Gila and Salt River Base and Meridian

Section 20: E½SE¼
Section 28: W½SW¼
Section 29: E½E½
Section 33: SE¼SE¼, W½SE¼, NE¼SW¼, E½NW¼, SW¼NE¼, NW¼NW¼

APPENDIX J.

USFWS Consultation & Concurrence Letter

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Las Cruces Field Office
1800 Marquess
Las Cruces, NM 88005
www.az.blm.gov

In Reply Refer To:
6840/2800 (AZ-932)

Memorandum

To: Field Supervisor, U.S. Fish and Wildlife Service
2321 West Royal Palm Road, Suite 103, Phoenix, AZ 85021

From: Lorraine J. Salas, Las Cruces Field Office, 1800 Marquess, Las Cruces, NM 88005

Subject: Endangered Species Act Coordination and Consultation for the SFPP East Line Expansion Project (AES/SE 02-21-04-I-0155), Request for Concurrence on Determinations

The Bureau of Land Management (BLM) is requesting concurrence on determinations on two endangered species potentially affected by the Santa Fe Pacific Pipeline, L.P. (SFPP), East Line Expansion Project. The attached Biological Evaluation (BE) analyzes the impacts associated with the project on the endangered cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) and the lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*). Based on information contained in the BE, we find that the proposed project may affect, but is not likely to adversely affect, either the cactus ferruginous pygmy-owl or lesser long-nosed bat. As lead Federal agency, the BLM is requesting concurrence from U.S. Fish and Wildlife Service (USFWS) on this finding to meet our requirements under Section 7 of the Endangered Species Act (ESA). Conservation measures set forth in the BE will be incorporated into the project description of the Environmental Assessment being prepared concurrently as part of compliance with the National Environmental Policy Act (NEPA).

As described in our request for project evaluation (Memorandum dated March 29 2004), SFPP is the operating partnership for Kinder Morgan Energy Partners, L.P., and is proposing to construct a petroleum products pipeline divided into four segments that will generally parallel existing pipelines along SFPP's present route from El Paso, Texas to Phoenix, Arizona**.** This project will provide additional capacity for petroleum products into the Tucson/Phoenix markets. The SFPP plan is to begin construction in June 2005. The project is divided into four logical segments from east to west. The segments are based on continuous or contiguous areas where the new pipeline is proposed for constructed. The routes of the new segments were dictated largely by the location of the existing pipeline.

BLM is the lead Federal agency for compliance with NEPA, as well as the lead for compliance with Section 7 of the ESA. The Bureau of Indian Affairs (BIA) is serving as a cooperating agency.

Mark Cochran of Transcon Environmental, a subcontractor of CH2M HILL, is the BLM's non-Federal representative for this project.

Please feel free to contact Ted Cordery, Endangered Species Coordinator, at 602-417-9242, or Mark Cochran at 520-293-5054, if you require further information or wish to discuss this project.

_____________________-Las Cruces FO

Attachments
Biological Evaluation

cc: Ms. Lorraine Salas, BLM Las Cruces FO
Bill Merhege, BLM Las Cruces FO
Mr. Keith Moon, BLM AZ-931
Scott Evans, BLM AZ-040
Peter Overton, BIA, Pima Agency
Allan Campbell, TRC/SFPP/Kinder Morgan Energy Partners
Dave Cornman, SFPP/Kinder Morgan Energy Partners
Regan Giese, CH2M HILL
Mark Cochran, Transcon Environmental (CH2M HILL subcontractor)

AESO/SE
02-21-04-I-0155

March 15, 2005

Memorandum

To: Field Manager, Las Cruces, BLM, Las Cruces, NM

From: Field Supervisor, U.S. Fish and Wildlife Service, Phoenix AZ

Subject: Endangered Species Act Coordination and Consultation for the Santa Fe Pacific Pipeline East Line Expansion Project, Request for Concurrence on Determination (NMNM 110629 – 6840/2800 (03000))

Thank you for your correspondence of January 11, 2005 requesting our concurrence regarding the effects to the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*; pygmy-owl) and the lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) from the proposed construction of a Santa Fe Pacific pipeline expansion project (NMNM 110629 6840/2800 (03000)) running from El Paso, Texas to Phoenix, Arizona. The pygmy-owl and the lesser long-nosed bat are species listed as endangered under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Portions of this project fall within an area that has been proposed as critical habitat for the pygmy-owl (67 FR 71032-71064).

The proposed action is the authorization of an expansion pipeline to provide additional capacity for petroleum products to the Tucson and Phoenix markets. Federal involvement with this project stems from its route across lands managed by the Bureau of Land Management and the need for a Clean Water Act 404 permit. The project will be constructed in four segments. Only Segment 3 supports suitable habitat for the pygmy-owl and lesser long-nosed bat. A portion of Segment 3 is proposed as critical habitat for the pygmy-owl. Therefore, our analysis will be restricted to Segment 3 of the proposed project. Segment 3 is defined as the Marana to Toltec Segment and runs adjacent to Interstate-10 and the Union Pacific Railroad corridor.

Segment 3 supports typical Sonoran desertscrub vegetation in both the Arizona Upland and Lower Colorado River subdivisions. As the Biological Evaluation indicates, there are a number of large trees and saguaros within the project area, including palo verde (*Parkinsonia* spp.), ironwood (*Olneya tesota*), and mesquite (*Prosopis velutina*) trees. Other plant species on site include creosote (*Larrea tridentata*), prickly pear and cholla (*Opuntia* spp.), desert hackberry (*Celtis pallida*), and acacia (*Acacia greggii* and *A. constricta*).

In Arizona, pygmy-owls have been reported in riparian woodlands, mesquite bosques, and Sonoran desertscrub communities. Upland vegetation communities reported to support pygmy-owls consisted of palo verde, ironwood, mesquite, acacia, bursage (*Ambrosia* spp.), and columnar cacti. Pygmy-owls also use xeroriparian habitats within a number of vegetation communities. Potential impacts to pygmy-owls and proposed critical habitat may occur from the clearing and filling associated with the proposed project. Noise and activities associated with this project also have the potential to disturb or disrupt nesting and dispersing pygmy-owls.

The potential impacts to pygmy-owls and proposed critical habitat have been avoided or addressed by the project proponents. We reiterate the importance of implementing the following measures included within the project information:

- All saguaros will be avoided and preserved in place.

- Large trees will be avoided to the maximum extent practicable. This will require selectively reducing the width of the disturbance area.

- To compensate for the loss of large trees that cannot be avoided, Kinder Morgan will pay an in-lieu fee based on the Arizona State Land Department's standard of $5/tree removed. These in-lieu fees will be paid to the Town of Marana for use in revegetation projects occurring within proposed critical habitat for the pygmy-owl.

- Work through Segment 3 will be confined to the non-breeding season (August 1 – January 31).

- The amount of time spent within Segment 3 will be relatively short, and the project proponents have committed to proceeding as quickly as possible through this segment of the project.

Considering the above measures and the information you have provided, we concur that the proposed action may affect, but is not likely to adversely affect the endangered cactus ferruginous pygmy-owl, nor will it adversely modify or destroy proposed critical habitat, for the following reasons:

- Impacts to pygmy-owl habitat components, primarily large trees and saguaros, will be avoided or minimized.

- In-lieu fees will contribute to habitat restoration within proposed pygmy-owl critical habitat.

- Noise and activity disturbance will be avoided by completing heavy construction activities outside of the pygmy-owl breeding season.

- Sufficient minimization measures are included in the proposed action.

We also concur that the project may affect, but is not likely to adversely affect the lesser long-nosed bat based on the commitment to avoid all saguaro cacti and preserve them in place.

If project plans change, or if additional information becomes available about the distribution of listed species, this determination may be reconsidered. Should this occur, please contact us regarding the need for further consultation. In any future correspondence, please refer to consultation number 02-21-04-I-0155. If you have any questions, please contact Scott Richardson (520) 670-6150 (x242) or Sherry Barrett (x223).

/s/ Steven L. Spangle

cc: Transcon Environmental, Tucson, AZ (Attn: Mark Cochran)
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ
Field Supervisor, Fish and Wildlife Service, Albuquerque, NM

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Dear Ted:

As you may be aware, we recently sent our concurrence letter regarding the
SFPP East Line Expansion Project to the Field Manager of the Las Cruces BLM Office. I have attached a copy of our concurrence for your information.

Mr. Mark Cochran, of Transcon Environmental, just brought to my attention an issue within the concurrence letter that needs clarification. We indicated that the Biological Evaluation (BE) stated that work within Segment 3 would occur outside of the pygmy-owl breeding season. However, the BE actually indicates that only those areas within Segment 3 that support potential pygmy-owl breeding habitat would be subject to this condition. We understand this difference and concur that only those areas within Segment 3 where there is actually potential for pygmy-owl breeding need to be considered for seasonal restrictions. We also concur that it is only in the area of McClellan Wash, near the Picacho Mountains, that potential pygmy-owl breeding habitat occurs. We understand and concur that only this area needs to be subject to the condition related to working outside the pygmy-owl breeding season.

Please consider our clarified intent regarding this issue as you continue with the NEPA process for this project. Please contact me if you have any questions or need additional information.

Sincerely,

Scott Richardson
U.S. Fish and Wildlife Service
Tucson Suboffice
(520) 670-6150 x 242